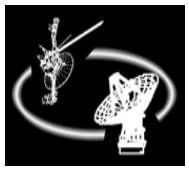

*Deep Space Mission System*

# VLBI Science Receiver (VSR) Software Operator's Manual

## *Full Spectrum Processing Subsystem (FSP)*

## System/Subsystem Operator and User Document

**Supersedes 837-037**

Applicable Program ID(s): **DVS-6130-OP-B, Version 2.3**
Relates to DSMS Configuration Item(s): **241.402**

DSMS No. **837-037, Rev. A**
Issue Date: March 5, 2003
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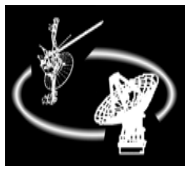
**Jet Propulsion Laboratory**
**California Institute of Technology**



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# TABLE OF CONTENTS


| Section | Title | Page |
|---|---|---|
| SECTION 1 | OPERATIONAL OVERVIEW | 1-1 |
| 1.1 | Overview and Operating Modes | 1-1 |
| 1.1.1 | VSR Functionality | 1-7 |
| 1.1.2 | Interfaces | 1-9 |
| 1.1.3 | Modes of Operation | 1-13 |
| 1.1.4 | Controls | 1-13 |
| 1.2 | Equipment Setup | 1-13 |
| 1.3 | Conventions and Notation | 1-13 |
| 1.3.1 | Conventions | 1-13 |
| 1.3.2 | Notation | 1-15 |
| SECTION 2 | OPERATIONS INTERFACES | 2-1 |
| 2.1 | Operator Directives - Quick Reference | 2-1 |
| 2.1.1 | Unix Commands – Quick Reference | 2-1 |
| 2.1.2 | Client Directives - Quick Reference | 2-3 |
| 2.1.2 | Configuration Table Parameters - Quick Reference | 2-8 |
| 2.2 | Operator Directives - Detailed Description | 2-10 |
| 2.2.1 | Unix Commands – Detailed Description | 2-10 |
| 2.2.2 | Client Directives – Detailed Description | 2-30 |
| 2.3 | Menus - Detailed Description | 2-92 |
| 2.3.1 | Displays Pulldown Menu | 2-92 |
| 2.1.3 | Graphics Pulldown Menu | 2-96 |
| 2.1.4 | Directives Pulldown Menu | 2-100 |

| Section | Title | Page |
|---|---|---|
| 2.4 | Icons | 2-101 |
| 2.5 | Forms | 2-101 |
| 2.6 | Function Keys | 2-101 |
| 2.7 | Other Interactions | 2-101 |
| 2.7.1 | Help Pulldown Menu | 2-105 |
| SECTION 3 MONITORING AND STATUS DISPLAYS | | 3-1 |
| 3.1 | Displays - Quick Reference | 3-1 |
| 3.2 | Display - Hierarchy | 3-2 |
| 3.1 | Display - Detailed Description | 3-7 |
| SECTION 4 MESSAGES | | 4-1 |
| 4.1 | Event Notices | 4-1 |
| 4.1.1 | Log-Only | 4-21 |
| 4.1.2 | Recovered | 4-22 |
| 4.2 | Prompts | 4-22 |
| 4.3 | Other Messages | 4-22 |
| SECTION 5 REPORTS | | 5-1 |
| SECTION 6 OPERATIONAL SCENARIOS | | 6-1 |
| 6.1 | Normal Interactive Operations | 6-1 |
| 6.1.1 | Initiation and Use of Text Mode | 6-1 |
| 6.1.2 | Initiation and Use of GUI Mode | 6-3 |
| 6.2 | Scripted Operations | 6-5 |
| 6.3 | Diagnostic Program Execution | 6-5 |


**TABLE OF CONTENTS**


| Section | Title | Page |
|---|---|---|

6.4 Operational Characteristics ..... 6-5
6.4.1 Local File Management ..... 6-5
SECTION 7 TROUBLESHOOTING ..... 7-1
7.1 On-Line Help ..... 7-1
7.2 Off-Line Help ..... 7-1
7.3 Diagnostics ..... 7-1
7.4 Recovery Procedures/Maintenance ..... 7-2
7.4.1 VSR Software Failure ..... 7-2
7.4.2 VSR Hardware Failure ..... 7-2
7.4.3 FMT Hardware Failure ..... 7-3
7.4.4 IF Switch Failure ..... 7-3
7.4.5 Failure in Connection to MDS ..... 7-3
7.4.6 Playback Failure ..... 7-3
SECTION 8 TOOLS AND UTILITIES ..... 8-1
APPENDIX A ACRONYMS AND ABBREVIATIONS ..... A-1
APPENDIX B DEFAULT PARAMETERS (MISSION-DEPENDENT) ..... B-1
APPENDIX C TUTORIALS AND TECHNICAL INFORMATION ..... C-1

## *LIST OF FIGURES*


| Figure | Title | Page |
|---|---|---|
| Figure 1-1 | VSR Filter Processing | 1-2 |
| Figure 1-2 | Context of the VLBI Science Receiver | 1-3 |
| Figure 1-3 | Main Hardware Components of the VSR | 1-4 |
| Figure 1-4 | Functional diagram of the VSR | 1-5 |
| Figure 1-5 | Functional diagram of the VSR Server (with its channel hardware) | 1-6 |
| Figure 1-6 | VSR Components and Command Interfaces | 1-11 |
| Figure 1-7 | State Diagram for the VSR Server | 1-12 |
| Figure 2-1 | Plot of Allan Deviation | 2-13 |
| Figure 2-2 | Plot of FFT amplitude | 2-14 |
| Figure 2-3 | Plot of Average Frequencies over 1-second Intervals | 2-15 |
| Figure 2-4 | ATT Dialog | 2-31 |
| Figure 2-5 | CHAN Dialog | 2-35 |
| Figure 2-6 | DDCLO Dialog | 2-38 |
| Figure 2-7 | FGAIN Dialog | 2-49 |
| Figure 2-8 | FRO Dialog | 2-51 |
| Figure 2-9 | FROV Dialog | 2-53 |
| Figure 2-10 | FRR Dialog | 2-55 |
| Figure 2-11 | Halt Confirmation Dialog | 2-56 |
| Figure 2-12 | IFS Dialog | 2-59 |
| Figure 2-13 | PRED Dialog | 2-65 |
| Figure 2-14 | Quit Confirmation Dialog | 2-69 |
| Figure 2-15 | REC Dialog | 2-71 |
| Figure 2-16 | SCRPT Error Dialog | 2-75 |
| Figure 2-17 | SCRPT Dialog | 2-76 |
| Figure 2-18 | SDPLR Dialog | 2-78 |
| Figure 2-19 | SFRO Dialog | 2-81 |
| Figure 2-20 | WAY Dialog | 2-89 |
| Figure 2-21 | Displays->Configuration Menu | 2-94 |
| Figure 2-22 | Displays ->Status/Performance Menu | 2-95 |
| Figure 2-23 | Graphics FFT Menu | 2-98 |
| Figure 2-24 | Graphics Histogram Menu | 2-99 |
| Figure 2-25 | Directives Main Menu | 2-102 |

Figure 2-26 Directives Schan Menu ..... 2-103
Figure 2-27 Directives Control Menu ..... 2-104
Figure 2-28 Help Menu ..... 2-106
Figure 3-1 BLS Display ..... 3-7
Figure 3-2 CHAN Display ..... 3-10
Figure 3-3 CNF Display ..... 3-14
Figure 3-4 FFT2 Plot ..... 3-19
Figure 3-5 FTHW Display ..... 3-22
Figure 3-6 HISTADC Display ..... 3-28
Figure 3-7 PTHN Display ..... 3-31
Figure 3-8 STS Display ..... 3-34
Figure 3-9 Text Client or tclient ..... 3-37
Figure 3-10 tclient attached to CNF display for gconnect interface ..... 3-38

## *LIST OF TABLES*

**Table** **Title** **Page**

Table 2-1 Valid Settings for Channel's Subchannel Configuration ..... 2-34

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# SECTION 1

# *OPERATIONAL OVERVIEW*

## 1.1 Overview and Operating Modes

The VLBI Science System provides support for spacecraft navigation performed by JPL and the Deep Space Network (DSN). Observables for DDOR experiments are the differential phases of the subcarrier or tones of a spacecraft communication signal and the correlated values from a nearby extra-galactic radio source, or Quasar, recorded at two complexes of the DSN. The DSN VLBI processing Group and the Differential One-Way Range Subsystem are designed to enable accurate measurement of these observables and to deliver this data to the DSN Navigation System.

The VLBI Science Receiver (VSR) is the component of the system that processes and records the open-loop data. It is part of the Full Spectrum Processing Subsystem (FSP) (see below for a brief description) and will be fully designated as the Full Spectrum Processing VLBI Science Receiver (FSP-VSR), but usually FSR-V for the hardware and VSR for the hardware and software combined. The VSR is an open loop receiver that takes in analog 300 MHz signals that come to it via the Block V RF-to-IF downconverters. The VSR filters and digitizes this signal, further downconverts it and selects several portions of it with the use of narrow band digital filters. The digital samples of these narrow band signals are time tagged and recorded for later processing. Figure 1-1 shows how the incoming IF signals are processed down to the narrow band sub-channels.

The FSP is a DSN subsystem that supports various functions that make use of the Full Spectrum Receivers (FSRs). Presently these functions include Arraying, Radio Science Recording and Very Long Baseline Interferometry (VLBI) Recording for Navigation. The FSRs that support these functions are, for the most part, identical, differing only in the particular VME boards that provides for a specific application, and the software that controls them. This allows hardware sparing of whole FSRs between some applications, and common component sparing for all of the applications, thereby reducing maintenance and sustaining costs. There are two VSRs within an FSR-V. A VSR can use up to four channels, depending on how many the other virtual VSR is using at the same time.

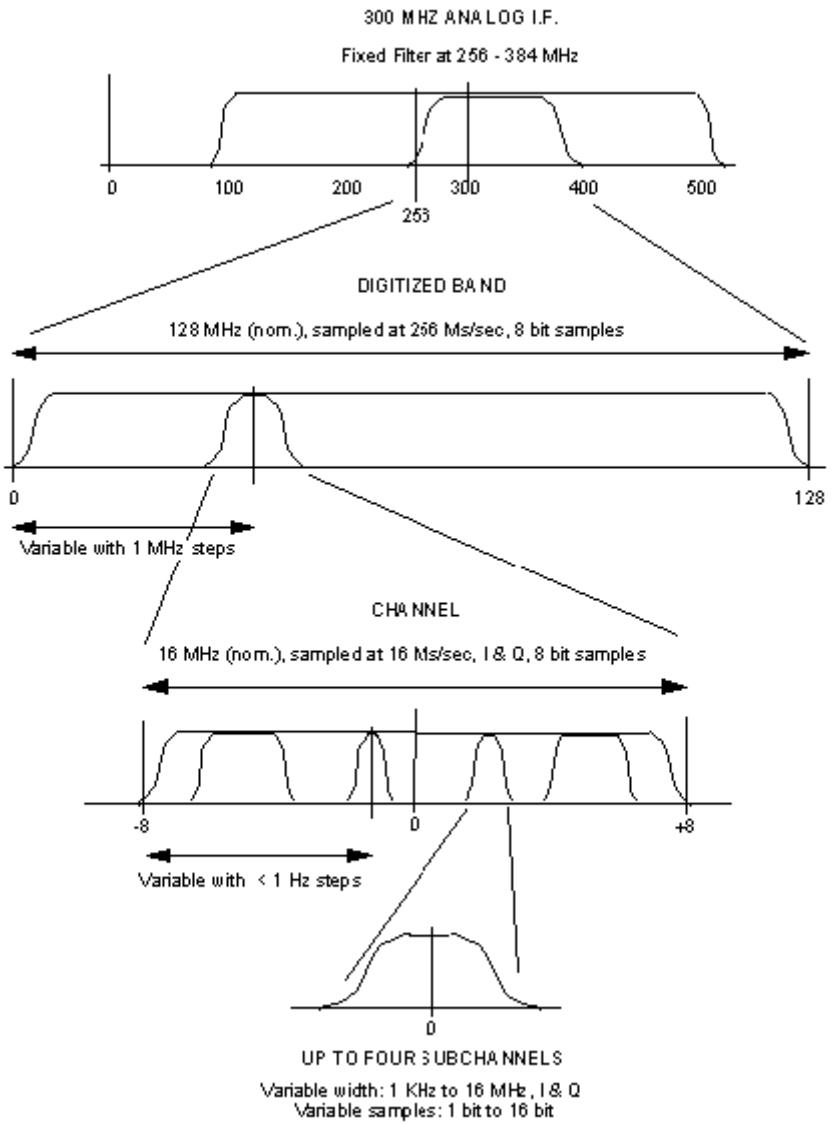


Figure 1-1 VSR Filter Processing

The receiver described in this document is a replacement for the obsolete VLBI Science receiver (the DSP-V). The context of the VSR within a DSN complex is illustrated in Figure 1-2 and described in the paragraphs below.

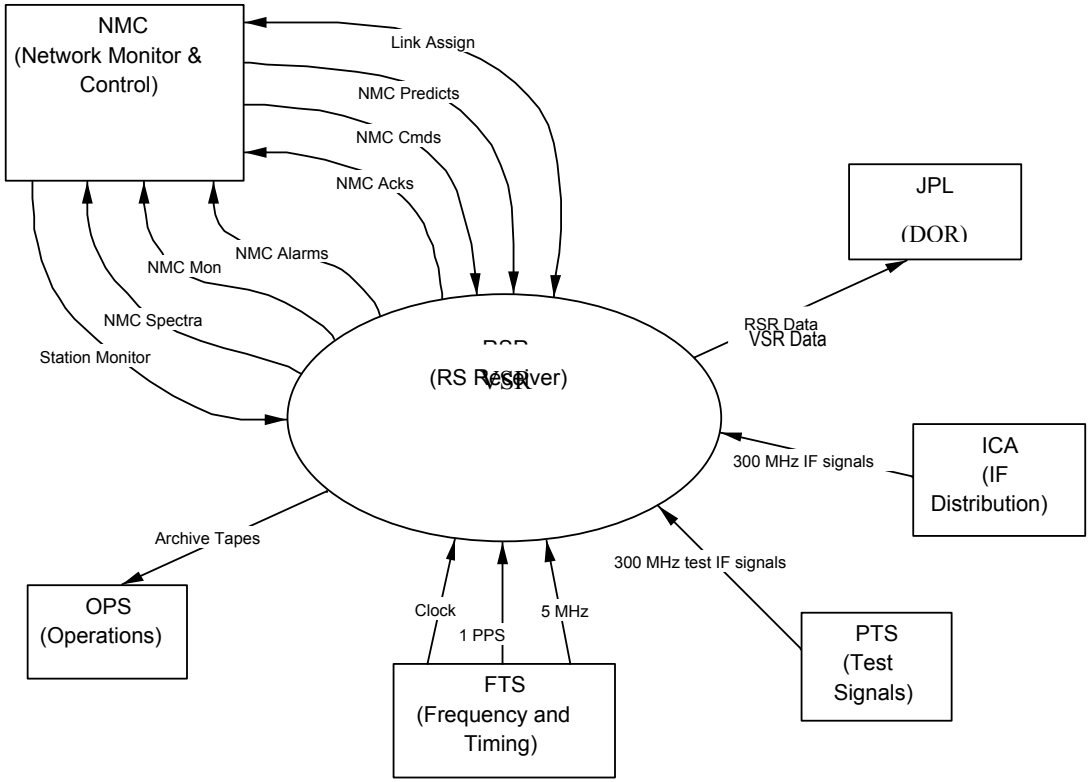


Figure 1-2 Context of the VLBI Science Receiver

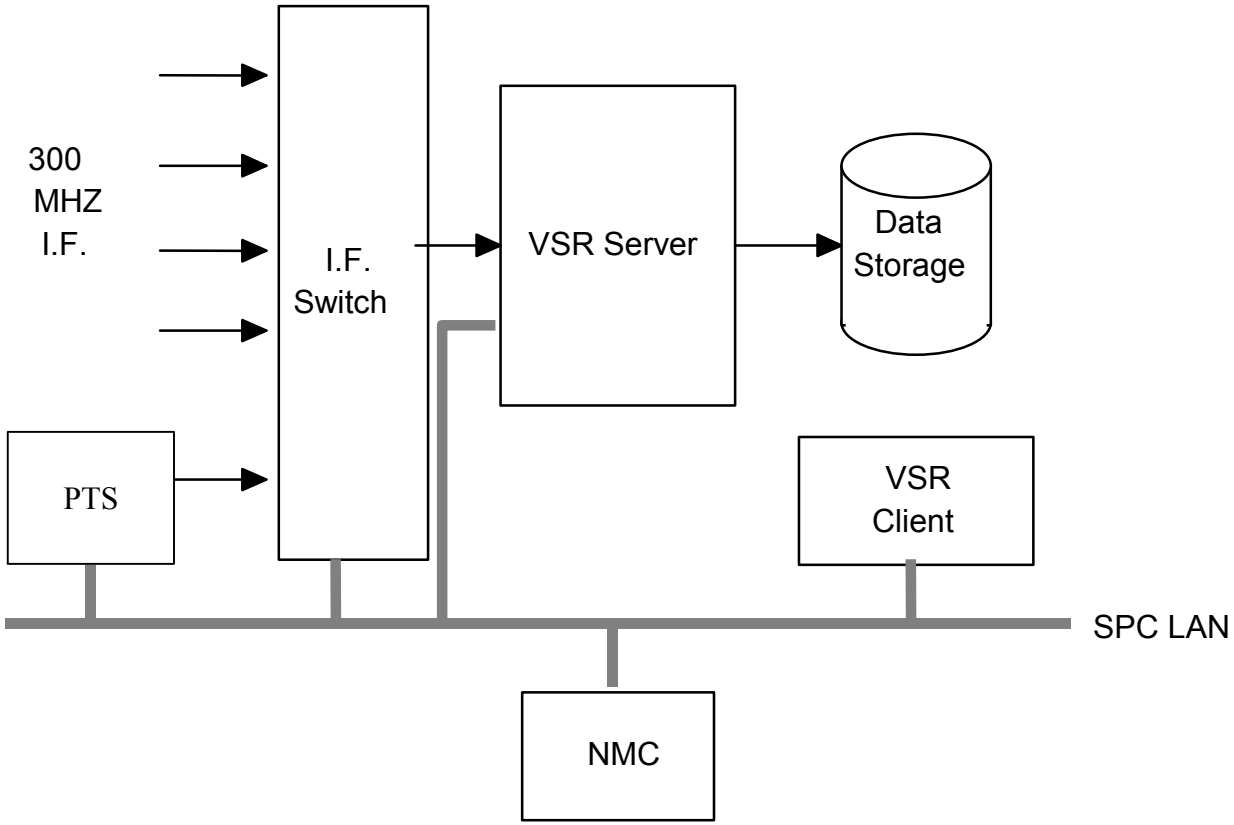


Figure 1-3 Main Hardware Components of the VSR

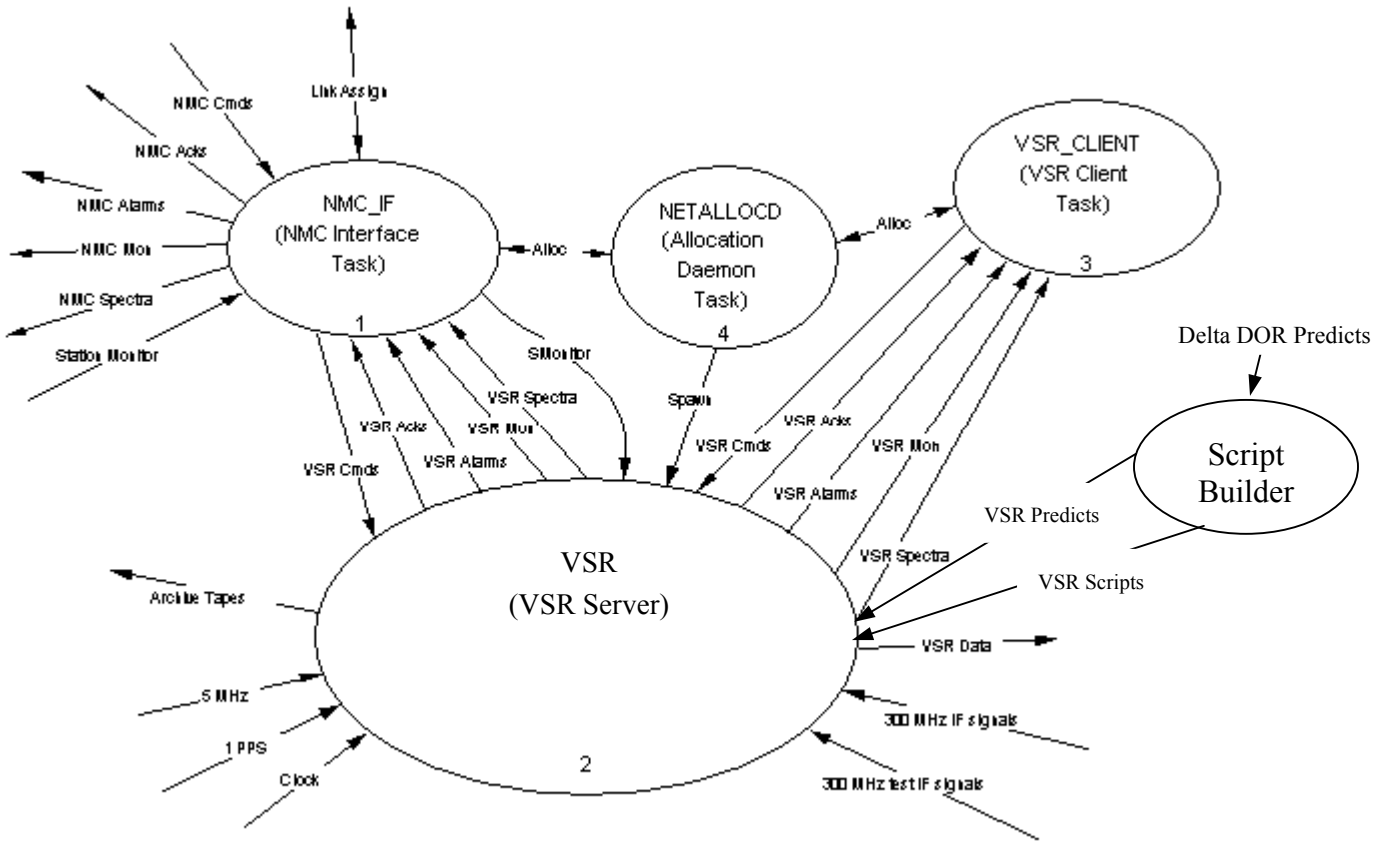


Figure 1-4 Functional diagram of the VSR

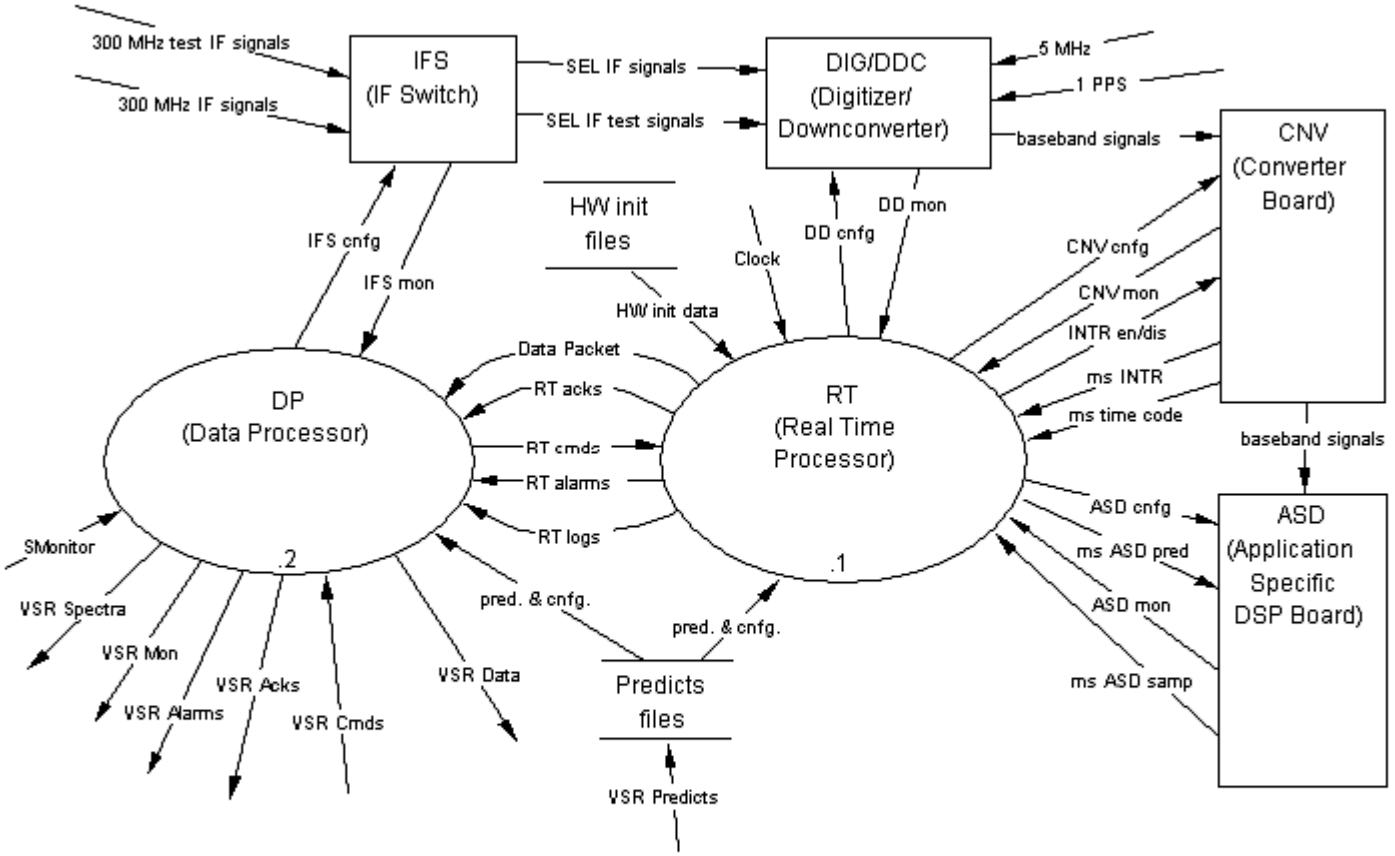


Figure 1-5 Functional diagram of the VSR Server (with its channel hardware)

### 1.1.1 VSR Functionality

The VSR at a DSN complex is made up of four main components: a Client, a Server, Data storage and an IF Selector Switch. In addition, there is the Precision Telemetry Simulator (PTS) assembly that provides test IF signals. The Client provides two ways to control the VSR: either using a Network Monitor and Control (NMC) interface, or using a Remote Client interface. Figure 1-3 shows the main components of VSR together with its main external support equipment (e.g. the NMC and the PTS). A description of each component is presented below. A functional diagram of VSR and its interface and startup software is shown in Figure 1-4, while a next level functional diagram of the receiver main components is shown in Figure 1-5.

#### 1.1.1.1 VLBI Science Receiver Client

The VSR Client is the subsystem controller for the VSR. It processes operator commands and sends them to the VSR Server for translation into appropriate action. The VSR Client and the VSR Server function in a client - server relationship. The client receives performance monitor data from the server, including spectra of the various channels processed by the VSR. The display of this data requires use of the Graphical User Interface (GUI) version of the client. This GUI is described in Section 3. The client can function either through an NMC connection, locally to the VSR and launched using the UNIX command gconnect, or remotely using gconnect and connecting via a network interface. Also available is the benign client, or bconnect. This client has all the monitoring capabilities of gconnect, but cannot allocate a VSR or issue directives while in a connection. The bconnect client should be used for observe-only purposes and can be connected after the VSR has been allocated by another client connection. Using the local or remote gconnect involves starting up a VSR in a stand-alone mode, where the NMC is not involved, or as a remote operator console after the NMC starts up a VSR in operational mode. If the VSR is run in a stand-alone mode, then there is no connection established with the NMC Connection Engine (CE), the Monitor Data Server (MDS) or the NMC File System (NMCFS). Consequently, in this mode there is no Station Monitor data being subscribed to by the VSR, nor VSR Monitor data being published to the MDS. The remote client software runs on a standard SUN workstation that normally includes a keyboard and monitor. It can be run on a workstation without keyboard and monitor (e.g. the VSR Data Processor itself) to execute pre-defined scripts via the @job batch facility under UNIX, or by connecting from a remote terminal with ssh. The NMC and the remote client interfaces are nearly identical, with the exception of the connection bar, directive input, and the event notice display (see section 3). Any number of remote clients can be connected to a server simultaneously, which allows multiple users to monitor the performance of a given VSR at the same time. Since any of these multiple clients, with the exception of bconnect, can issue commands to the VSR, the operators must take care to coordinate their activities. More detailed discussion is provided in Section 6.

#### 1.1.1.2 VLBI Science Receiver Server

The VSR Server is the server for the controller clients, and supports control of one VSR channel. It runs on the VSR Data Processor (DP) and provides an interface to either the NMC client and/or multiple remote clients. Most commands to and monitor from the clients pass to this module. All predicts files and script files must reside on the VSR file system. At startup, within the VSR DP, an allocation daemon is running that provides the first point of contact from the client for spawning and configuring a VSR Server.

The server awaits connections from the client. Once connected, a remote client issues identification and user contact information, which is saved by the server. In response to the identification information, the server issues a client identification number. This number is used to identify commands originating from that client. The remote client information is never deleted during an experiment. An NMC client only issues information identifying which NMC client it is.

The server receives Operator Directives (ODs) from the client that may include a time-tag. When the time arrives for execution of the OD, it is executed, either in the Data Processor (DP) or in the Real Time Processor (RT) that are part of the receiver server, and an event message is returned indicating the progress or failure of the OD.

One VSR receiver band is allocated to a VSR Server, and controlled by a VSR client. (A pair of VSR receiver bands comprises one physical Full Spectrum Receiver, or FSR. The VSR receiver selects a 300 MHz I.F. via the IF Switch, digitizes, down-converts and filters it down to one to four 16-MHz I and Q digital baseband signals. The baseband signal is then passed to a set of up to two narrowband and two wideband filters, or sub-channels, which can be driven by one set of frequency predicts. The digital output of these filters is written to disk as the recorded product of the VSR. Monitor of signal detection is provided via spectrum analysis. Each client is able to select inputs to the VSR, either from an antenna IF or an internal test signal source from the PTS, by controlling the IF Switch. The two receivers share the four baseband channels so the sum of each can not exceed four.

At each complex are two dedicated VSR receivers (one FSR) and two additional receivers (one FSR) available as a spare (this FSR is shared with Radio Science).

A VSR receiver is comprised of software running on a SUN Ultra-2 workstation (the Data Processor, or DP), a port into the front-end IF selector switch, and several specially built H/W chassis, including a digitizer, a digital downconverter and some VME equipment for filtering. The VME filter boards are controlled by a Real Time (RT) processor, also in the VME chassis.

#### 1.1.1.3 Data Storage

Data Storage for the VSR consists of two IO chassis with at least 20 Gbytes of disk and a DLT Tape drive for backups and archiving of data. This equipment is attached to the Data Processor SUN Workstation via SCSI ports and fiberchannel. The VSR makes use of the Storage Area Network (SAN) to store large recordings that wouldn't fit on the standard SUN file system partitions. The Block Level SAN (BLS) or Blue Light Special system is JPL developed software that stripes data across multiple drives, similar to Redundant Array of Inexpensive Disks (RAID) technology.

#### 1.1.1.4 I.F. Switch (IFS)

The IF Switch permits a VSR Server to be connected to the antenna 300 MHz IF signals. It is controlled from within each receiver server via a network connection on the switch. The switch is a full 16 x 8 cross-bar design that allows any output port to be connected to any input. At Goldstone, two of these switches are provided to allow connection to all of the FSRs used in arraying, Radio Science and VLBI. The switch also has two PTS inputs, which can be used by the VSR Server.

#### 1.1.1.5 Precision Telemetry Simulator (PTS)

The PTS is not strictly a part of the VSR. It is an external device that provides IF test signals for FSP subsystem-level testing. Its signals are generated in the digital domain and subsequently converted to analog, with signal conditions driven from predicts. At least two simulated signals can be generated, each having its own characteristics in terms of Doppler and signal level, etc. The PTS signals are injected into the VSR via the IF Switch inputs.

The PTS consists of application-specific firmware, a single board computer (PC104) and a set of PC boards for test signal generation. Control of the PTS is provided via a network connection using a web browser on the FSP Terminal Maintenance (FMT).

#### 1.1.1.6 Network Monitor and Control (NMC)

The NMC, like the PTS, is also not a direct part of the VSR, but is the main station operator interface for controlling a VSR in its operational mode. See the SOM for more details of communication.

### 1.1.2 Interfaces

The interfaces discussed in this section are restricted to those that have an impact on operators. Other physical interfaces, either in the hardware or software domain, are not addressed. For maintenance purpose, specific hardware interfaces can be found in the Operations Maintenance Manual (867-000028, JPL D-20313).

#### 1.1.2.1 Control Inputs

When power to a VSR is turned on, the SUN workstation that serves as the Data Processor boots up with an allocation daemon (NETALLOCD) and an NMC interface (NMC_IF) in their running state. The VSR server is then ready to be allocated to a client. A diagram showing the VSR components and command interface is seen in Figure 1-6. The state diagram seen in Figure 1-7 shows the various states and transitions for the VSR. To bring a VSR into service, it is required that an operator at a client console execute a UNIX command and Operator Directives (OD's).

At a remote client, the operator first issues a scan command at the UNIX prompt in order to determine which receivers are available for connection. Then the operator issues a gconnect command, which causes the loading of the client software components, whereupon the VSR Server transitions from its quiescent, Boot Up state, to the Configured state, and is ready to be re-configured for the particular setup needed.

Alternately, at the CS the operator assigns a VSR Server using the appropriate ddc, to a link, which causes the Global Connection Engine (GCE) to establish a connection (link) to the VSR. Receipt of the CCN ASSIGN will start the appropriate software in the VSR (if it is not already started). Then the assigned Connection Engine (CE) will pass operator directives and receive monitor data. Displays will be generated at the NMC from published monitor data.

To be configured, the VSR requires the following input:

Predict File

A set of frequency predicts is required for the each VSR. These predicts reside in a file that can be loaded via its name specified in the PRED directive. They enable signal detection more easily when the signal is varying in frequency.

The VSR comes up with the default configuration parameters and can use the header information from the predicts to set the station and signal parameters. Hardware and software parameters that are specific to any experiment can be set at this stage via type in, buttons, or, primarily, by a script of SET commands and operator directives to re-configure the VSR.

During an operational DOR pass, operators run a script that has been generated by script builder software that resides on the server. This software uses VSR Predicts files from NSS and DOR config files from DOR in order to create a script of directives which configure the VSR to track a DOR pass. VSR Predicts and DOR config files can be delivered to the VSR via SPPA with filename formats specified in Mon-2, or they can be delivered with filenames containing .vp and .cfg extensions respectively using FTP or SCP. SPPA files that are delivered to /support_data_input on the VSR using FTP are inspected to see if they contain the string "_tyV" in their filename (case insensitive). They are then inspected to see if they are preceded by a "p_" or "n_" indicating a predict or config file respectively and moved to other directories. Additionally, files that are delivered in the same way to the VSR that have either .vp or .cfg extensions, are moved. VSR Predict files are moved to the /vsr/sbuild/vp directory on the VSR while DOR config files are moved to /vsr/sbuild/cfg. For more information on the script builder, it's inputs and outputs, see the 820-016 0296-DOR-VSR interface agreement.

With these inputs and the additional, time dependent, directives either typed in or input via buttons or the script file, the operator can plan and direct all activity throughout the entire period of recording. The VSR is put into its Running state by issuing a RUN directive. Actual recording of data does not occur unless the REC directive is issued. The data can then be retrieved by DOR at JPL. At the end of the track, the VSR returns to the Configured state via a HALT directive. A QUIT directive issued from either state causes the VSR to return to the Booted state waiting to be re-allocated for another experiment. If in an NMC connection it will come back up unless taken out of the connection.

#### 1.1.2.2 VSR Outputs

Event notices are generated at each state transition, from any response to a command, or as a result of any error condition that needs attention from the operator. All of these are written in a log file as well as sent to the remote client(s) and the NMC client, if assigned. Once the VSR transitions to the running state, VSR status, signal detection parameters and frequency spectra are generated and sent periodically to the remote client(s) and displayed if its GUI version is running. These data are published (and can be displayed), if in an NMC connection. In addition, if the recording state is entered, the VLBI Science data, together with ancillary data, are written to disk using BLS, and retrieved by the DOR processor at JPL.

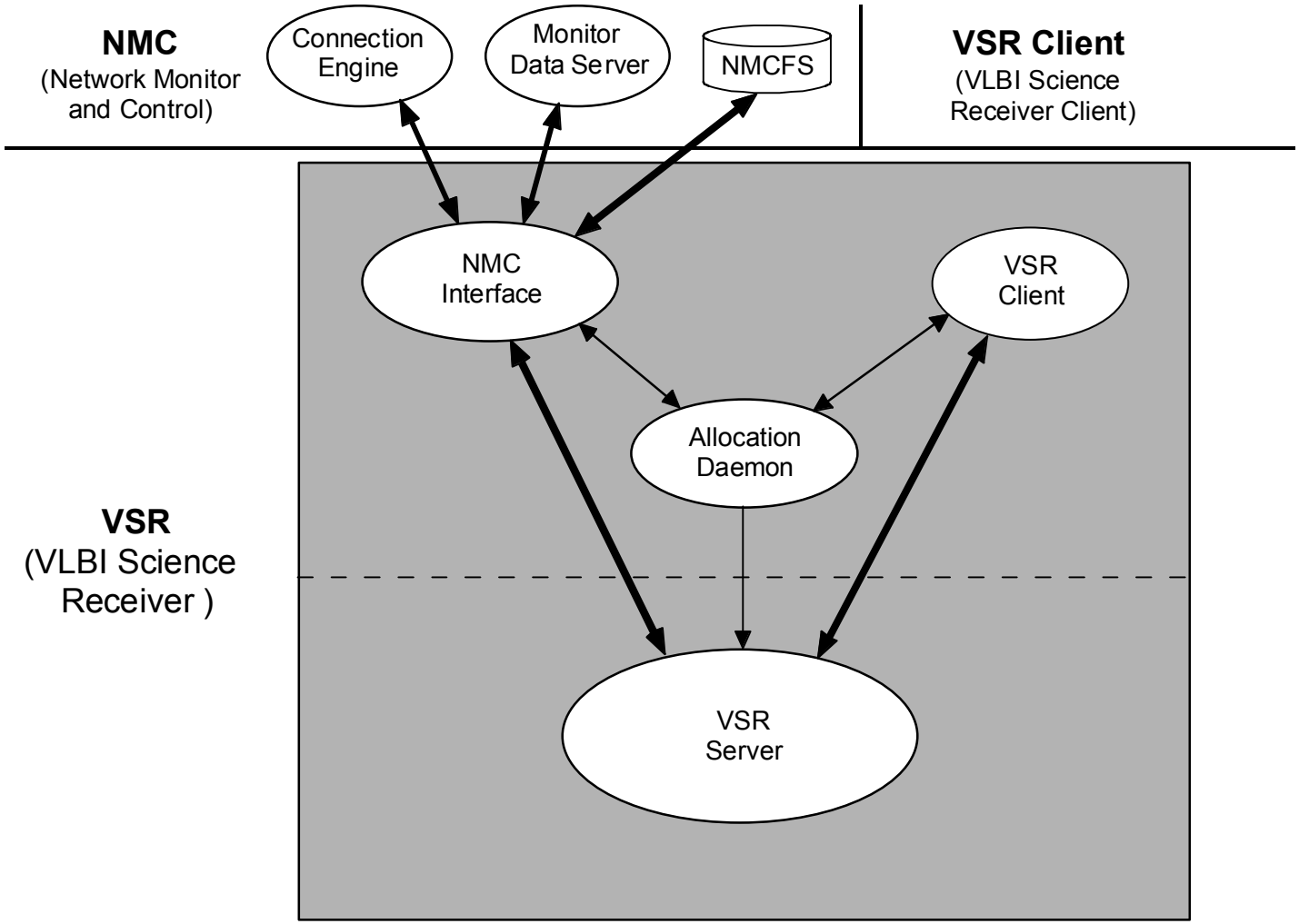


Figure 1-6 VSR Components and Command Interfaces

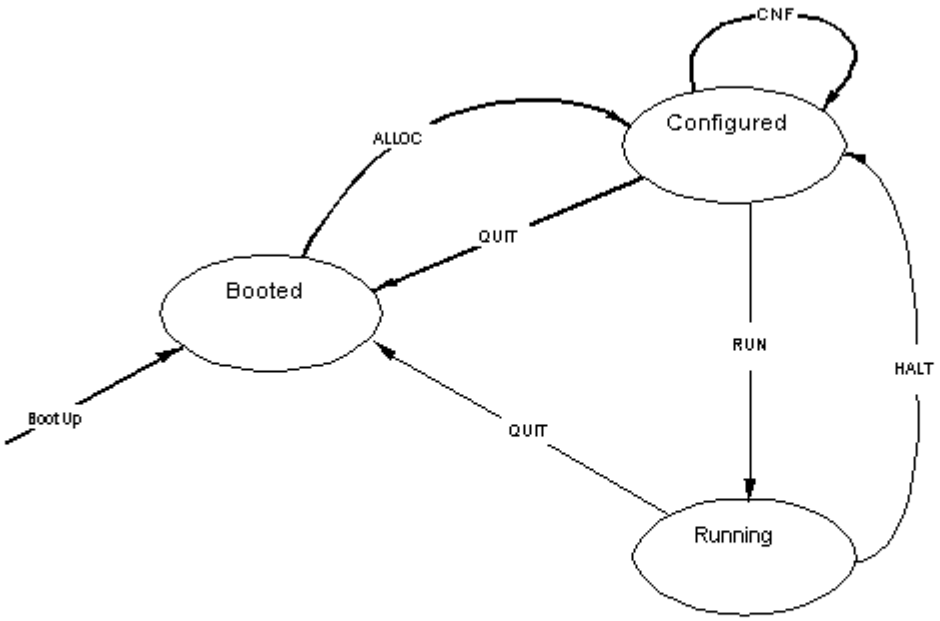


Figure 1-7 State Diagram for the VSR Server

### 1.1.3 Modes of Operation

There are two modes of operation in the VSR when it is in the Running state: Monitor Mode and Record Mode. Each mode is described in more detail in the following subsections. The Record Mode is entered or exited by executing the REC directive.

#### 1.1.3.1 Monitor Mode

The Monitor Mode of operation is where all running functions are being executed except recording Monitor and status are sent to the NMC (and the remote client(s)ifany are being used), log files are being generated, data are being collected for the spectral plots, the plots are being generated and can be sent along with the monitor data, and all of the run-time commands are operational. But, as stated, the data itself is not recorded on disk or tape (nor sent to JPL for processing). It is simply "dropped on the floor".

The Monitor Mode allows the operator to bring the system up and begin monitoring its operation before any data is actually recorded. It also allows the operation to continue during less interesting periods without filling up the output record with useless data. The record mode can be activated when something of value is being observed.

#### 1.1.3.2 Record Mode

In the Record Mode of operation, all of the functions that occur in the Monitor Mode also occur here, but the data are also being recorded on disk.

### 1.1.4 Controls

The VSR is an 820-019, MON-2-compliant subsystem which is operationally controlled via an NMC workstation. It can also run in a stand-alone mode via a remote client.

## 1.2 Equipment Setup

All VSR assemblies should be powered on.

## 1.3 Conventions and Notation

The various conventions and notations used in this SOM are described in the following subsections.

### 1.3.1 Conventions

The summary table of directives in this SOM are shown in alphabetic order. Most of the directives shown in the summary are underlined because they are hyperlinks in the electronic version of the SOM. The detailed description of each directive appears in alphabetic order. The following conventions are followed in this SOM for the user interfaces (e.g., Operator directives, displays, event messages, etc.) produced by the VSR. Each user interface is presented with the following textual information:

- description of the purpose of the user interface
- additional information (including itemized description of contents and data)
- limitations and notes

The following conventions will be used for character representation found in this SOM:

**DOY** - Day of Year

**hh** - Hours (GMT)

**mm** - Minutes (GMT)

**ss** - Seconds (GMT)

#### 1.3.1.1 Command Conventions

The commands, which are entered in the UNIX window, are all lower case.

#### 1.3.1.2 Directives Conventions

The NMC convention limits to five the number of characters in a directive for the VSR. There is no limitation on the number of characters for directives affecting only the remote client or the VSR Server.

The path names for the configuration, log, data, predicts and script files for the VSR are case sensitive. All other parts of a directive are not case sensitive.

The VSR directives are sent by the client (either remote client or NMC) to the VSR Server. Client directives are executed on the client.

The VSR responses to an Operator Directive may take three forms. After issuing a carriage return (CR) following the directive, a prompt will be returned if the directive made it to the server. When the directive is actually executed (depending on the time attached to it), the VSR will provide a 'COMPLETED' or 'STARTED' directive response provided the input is valid and no procedural errors have been made. If the input is unrecognizable or invalid, or a procedural error has been made, the VSR will return a 'REJECTED' directive response, and include some kind of a message detailing the problem. All directive responses are preceded by the issuing client number in brackets.

All ODs are logged in the VSR log file.

A directive entered without required parameters (query mode) will answer with current value.

#### 1.3.1.3 Message Conventions

The VSR assemblies produce two types of event messages, **Alarms** and **Advisories**. All event messages generated by the VSR Server are logged into a log file.

Messages produced by the VSR are grouped by category.

**Alarm** messages are about abnormal conditions for which the operator is expected to take some corrective action. There are two levels of alarm message severity: Critical and Warning. Critical level requires operator action or performance may degrade further. Warning level does not require operator action though performance may degrade. VSR assemblies do not generate Emergency alarms.

**Advisory** messages inform the operator of minor malfunctions, changes in status, routine progress, etc. Operator action is not required in response to an advisory message. There are five type of advisories: deviation, completion, progress, log-only, and recovery. Deviation advisory indicates any anomalous condition that requires no action by the operator. Completion advisory is used to report the completion of some expected (and therefore non-anomalous) event. Progress advisory is used to report an ongoing, routine (i.e., non-anomalous) activity. Log-Only advisory is used to report performance information which is not necessarily needed at the time it is reported, but needs to be available for review at a later time. Recovered advisory is used to inform the operator when the condition triggering an alarm no longer exists. No VSR assembly generates any recovery advisory.

### 1.3.2 Notation

#### 1.3.2.1 Directive Syntax Notation

The syntax of each operational directive is specified using a modified Backus Naur Form (BNF) grammar.

| NOTATION | MEANING |
|---|---|
| **<some-text>** | Letters between angle brackets are used to indicate that the angle brackets and text in between them must be replaced with some other text as specified in the accompanying notes to the directive format. |
| \| | The "or" bar indicates that either the symbol to the left of the bar or the symbol to the right of the bar must appear, but not both. If a choice must be made from more than two, the possible choices will appear in sequence with bars separating each. The bar is never input. |
| **[OPTION]** | Anything that appears between square brackets may be input or blanks may be input in its place. The brackets are not input. |
| **{1 \| 2}** | The braces are used to group symbols together for clarity. The braces are never input. |
| **<value>...** | When a symbol or group of symbols is followed by three periods, this indicates that the symbol may be repeated up to the specified number of times. |

When a blank space appears between symbols, one or more blank spaces or a comma may be input. When no space appears between symbols, the directive must be entered with no space at that point.

#### 1.3.2.1.1 Directive Format:

A directive consists of a directive name and a possibly optional variable parameter portion.

<directive name> [<parameter> … <parameter>]

Where:

| | |
|---|---|
| <directive name> | A 1-to-5 character name that begins with a letter and contains only numbers and letters. All directives must contain a directive name. |
| <parameter(s)> | Parameters are values that identify the exact information the system needs to execute the directive. Parameter values may be optional, depending on the directive being entered. |

### 1.3.2.2 Message Notation

Event messages are shown in this SOM just as they are output by the software. The accompanying descriptive text will explain the content and meaning of the variable fields. The response and rejection messages for each OD are shown in this SOM as they are output by the software. The accompanying text explains the content and meaning of the variable fields.

# SECTION 2

# *OPERATIONS INTERFACES*

## 2.1 Operator Directives - Quick Reference

### 2.1.1 Unix Commands – Quick Reference

These commands are executed at the Unix prompt in either the local client or remote server window depending on the function..

| MNEMONIC | UNIX Command DESCRIPTION/SYNTAX | XREF |
|---|---|---|
| **aldev** | Shows the Allan Deviation of data in a VSR recording. (This is a remote function)<br>aldev [ -a ] [ -f ] [ -s <time> ] <bls filename> [ total time ] | 2-10 |
| **bconnect** | A benign, observe-only version of gconnect. (Local function)<br>bconnect <contact name> <contact phone#> <spc#> VSR<xx> | |
| **bls_ls** | Lists the recorded bls files found on the VSR and their sizes. (Remote function)<br>bls_ls [-h <host>] [-a] [-q] <pattern> | 2-18 |
| **bls_mv** | Renames a BLS file<br>bls_mv <old_bls_filename> <new_bls_filename> | 2-19 |
| **bls_rm** | Removes a bls file from disks and directory. (Remote function)<br>bls_rm [-h <host>] [-a] [-f] <pattern> | 2-20 |
| **gconnect** | Allocates a VSR receiver to an experiment, brings up a GUI client and connects to it. (Local function)<br>gconnect <contact name> <contact phone#> <spc#> VSR<xx> | 2-21 |
| **sbuild** | Builds a VSR script for a Delta-DOR pass (Remote Function).<br>sbuild [-d] [-s <time>] <filename> | 2-23 |

| MNEMONIC | UNIX Command DESCRIPTION/SYNTAX | XREF |
|---|---|---|
| **scan** | Scans the VSR channels at all or the specified Signal Processing Center (SPC) and lists their status. (Local function)<br>scan [{10 \| 40 \| 60 \| 21}] | 2-24 |
| **tconnect** | Allocates a VSR channel to an experiment, if not already, brings up a terminal client and connects to it. (Local function)<br>tconnect [-y <email>] [-s <script path name>] [-a <ddd/hh:mm:ss>] [-help]<br><contact name> <contact phone#> <spc#> VSR<xx> | 2-25 |
| **vdr_dump** | Reads input file and, using options, writes ascii records to standard output. (Remote function)<br>vdr_dump [ -v] [-H<output file>] [-S<output file>] [-x] [-r] [-s] [-d] [-n<#samp/line>]<br>[<vdr_ filename>] | 2-26 |
| **vdr_io** | Tool for reformatting VSR Data Records (VDRs) (Remote Function)<br>vdr_io [-S] [-f <time>] [-l <time>] [-n <count>] [-O] <in_file> [<out_file>] | 2-27 |
| **vsr_jobs** | Gets a listing of the VSR AT jobs that are scheduled with tconnect<br>vsr_jobs [VSR<xx>] | |

### 2.1.2 Client Directives - Quick Reference

These directives are executed in the command window of the NMC connection or the VSR client. For the sub-channel variable, its value can be a number or be A or All for operating on all of the sub-channels.

| MNEMONIC | CLIENT DIRECTIVE DESCRIPTION/SYNTAX | XREF |
|---|---|---|
| ATT | Sets the VSR channel attenuator to the specified value. If value is the word AUTO, the attenuator is automatically set to give the optimum amp value. ATT also has a GUI dialog interface.<br>ATT {<attenuation> \| {AUTO [<desired_amp> ] } }  Limits are 0 to 31.5 dB, in steps of 0.5 dB | 2-30<br>2-31 |
| AVAIL | Shows whether the entered disk space in Mbytes is available for recording data<br>AVAIL <Mbytes required> | 2-32 |
| CHAN | Allocates a channel to this client and configures its bandwidths and bitrates<br>CHAN <#> {<#n1_bw :[ nbits]> \| D}  {<#n2_bw [: nbits]> \| D } {<#w1_bw [: nbits]> \| D } {<#w2_bw [: nbits] > \| D } | 2-33<br>3-10 |
| D | Launches a display. This is a client side directive.<br>D <display><br>displays: CHAN<L>, CNF, FFT<LMN>, FTH< M>, HIST<LMN>, HISTADC, PTH<M>, STS (L = 1,2,3,4, M=n,w, N=1,2) | 2-36 |
| DDCLO | Changes the local oscillator in the DDC. DDCLO also has a GUI dialog interface.<br>DDCLO <chan_id>{<MHz> \| AUTO }  Limits are 265 to 375 | 2-37<br>2-38 |
| DISC | Terminates connection to the channel. Used when the channel is to continue running under control of another client or to run unattended.<br>DISC | 2-39 |
| EVT | Enables or disables an event notice<br>EVT <E \| D \| YELL \| NOYELL> <# \| CRIT \| WARN \| DEV \| ALL>  Default =ALL are Enabled | 2-40 |

| MNEMONIC | CLIENT DIRECTIVE DESCRIPTION/SYNTAX | XREF |
|---|---|---|
| **EXPID** | Sets the experiment ID for the pass.<br>EXPID <text> | 2-41 |
| **FFTHW** | Enables/Disables the flag for applying a Hanning Window to the time data before doing the FFT<br>FFTHW <schanl_id> < E \| D > Default is Enabled | 2-42 |
| **FFTNA** | Sets the number of FFT power spectra to be averaged together to make one spectral display<br>FFTNA <schan_id> <#> Limits are 1 to 524288 / FFTNP (default is 10) | 2-43 |
| **FFTNP** | Sets the number of time-points in the FFT for generating a spectrum of the specified sub-channel<br>FFTNP <schan_id> <#> Limits are 64 to 32768/FFTZF & 32768/FFTNA (default is 1024) | 2-44 |
| **FFTTI** | Sets the time interval between the start of FFT spectrum generation<br>FFTTI <schan_id> <#secs> Limits are 1 to 10,000 (default is 10) | 2-45 |
| **FFTZF** | Sets the zero fill factor for the spectrum FFT<br>FFTZF <schan_id> <#> Limits are 1 to >32768/FFTNP (default is 4) | 2-46 |
| **FGAIN** | Sets the internal gain of the hardware filters to make most use of the dynamic range of the hardware bits. Uses an estimated Pc/No and the multiplier. FGAIN also has a GUI dialog interface.<br>FGAIN < schan_id \| all > {{<Pc/No > [multiplier] } \| auto }<br>Default Pc/N0 is 50., multiplier is 1.0 | 2-47<br>2-49 |
| **FRO** | Adds the specified value to the VSR predicts carrier frequency offset (offset accumulates). If the value is 0, then the offset is reset to zero. If WAY is not specified, then the present value is used. FRO also has a GUI dialog interface.<br>FRO <carrier_freq_offset> [<way>] | 2-50<br>2-53 |
| **FROV** | Frequency Override allows the user to override the sky frequency predicts with a fixed frequency.<br>If the value is 0, then the predicts will be used instead. FROV also has a GUI dialog interface.<br>FROV <freq> Limits depend on RF band, DDC LO, bandwidths, offsets, etc. | 2-52<br>2-53 |

| MNEMONIC | CLIENT DIRECTIVE DESCRIPTION/SYNTAX | XREF |
|---|---|---|
| FRR | Frequency Rate allows the user to add a rate to the existing predicts or frequency override. FRR also has a GUI dialog interface.<br>FRR <Hz./sec.> [<way>] | 2-54<br>2-55 |
| HALT | Stops data processing: return VSR state to Configured<br>HALT | 2-56 |
| HI | Tests communications with thereceiver. Returns the receiver ID and software ID and version number.<br>HI | 2-57 |
| IFS | Identifies or changes the desired IF input source<br>IFS { <dss_band_ifpath> \| AUTO } | 2-58<br>2-59 |
| LOG | Allows user to insert any message for event window and log file<br>LOG [<any message of length less than 256 characters>] | 2-60 |
| LOGFN | Allows user to change the file name of the log file; must be in Configure State<br>LOGFN <pathname> | 2-61 |
| MKINF | Makes a Delta DOR pass information file out of special lines in the log file that are preceded by "##"<br>MKINF <log filename> <info filename> | 2-62 |
| NOTFY | Sends notification of recorded data files to the post-processing system as a table of information (info file) about data recordings and the time they are expected to be complete.<br>NOTFY <info filename> | 2-63 |
| PRED | Loads the VSR Radiometric Predicts from a predict file (.dlf type) and sets various configuration items from values obtained from these predicts. PRED also has a GUI dialog interface.<br>PRED <predict file name> [< prdx_shift>] | 2-64<br>2-65 |

| MNEMONIC | CLIENT DIRECTIVE DESCRIPTION/SYNTAX | XREF |
|---|---|---|
| QUEUE | Allows display and manipulation of the command queue<br>QUEUE [<display \| delete \| shift>] [<more \| client \| relative-time> \| NOW] [<qentry>] | 2-66 |
| QUIT | Terminates VSR receiver processes and return to Booted State; also quits all clients<br>QUIT | 2-68 |
| REC | Enables/disables the recording of data samples by the VSR. REC also has a GUI dialog interface.<br>REC <schan_id> < E \| D > Default is Disabled | 2-70<br>2-71 |
| RECFN | Sets the name of the data file for a subchannel instead of default.<br>RECFN <schan_id> <file name> Default uses receiver, schan_id, date, and time | 2-72 |
| RUN | Begins data processing and moves VSR state to Running<br>RUN | 2-73 |
| SCRPT | Loads a file from the server in which there are operator directives, and places them on the VSR command queue as though they were typed in from the keyboard. SCRPT also has a GUI dialog interface.<br>SCRPT <script-file-name> or . <script-file-name> | 2-74 |
| SDPLR | Set the Doppler mode for this Subchannel<br>SDPLR <sub-channel_id> < CARR \| 1WAY > | 2-77<br>2-78 |
| SET | Sets Configuration Table parameters (see Table 2.1.3 below for parameters)<br>SET <parameter-name> <value> | 2-79 |
| SFRO | Sets the specified VSR sub-channel frequency offset to the specified value. SFRO also has a GUI dialog interface.<br>SFRO <sub-channed_id> <sub-channel_freq_offset > | 2-80<br>2-81 |
| SLBL | Identifing information for subchannels for displays and in the data files<br>LABEL <schan_id> <schan info> | 2-82 |

| MNEMONIC | CLIENT DIRECTIVE DESCRIPTION/SYNTAX | XREF |
|---|---|---|
| SRCID | Sets the “Source ID” field on the CNF display<br>SRCID <text> | 2-83 |
| TDDC | Run verification test on the Digital Downconverter | 2-84 |
| TDIG | Run verification test on the Digitizer | 2-85 |
| TPGM | Turns the Test Pattern Gernerator Monitor on or off<br>TPGM <AUTO \| OFF> | 2-86 |
| TSF | Sets the test synthesizer Frequency in MHz (IF)<br>TSF <freq> Limits: 200 to 400 in 0.25 steps | 2-87 |
| WAY | Sets the WAY used to choose the carrier frequency predicts. WAY also has a GUI dialog interface.<br>WAY <1, 2, 3> [<DSS_ID>] | 2-88 |
| WHOIS | Returns contact name and phone# to the client event window<br>WHOIS [<client#>] | 2-90 |
| YELL | Specifies which error message level is to be sent to whom<br>< E \| D > < email@domain > | 2-91 |

### 2.1.2 Configuration Table Parameters - Quick Reference

These are the parameters that go with the SET operator directive.

| CONFIG. ITEM | SET DESCRIPTION | XREF |
|---|---|---|
| **ATT_MAX_AMP_ERR** | Sets the maximum allowable error in dig amp from ATT_DESIRED_AMP before warning messages are issued. Range is 0 dB to 100 dB<br>SET ATT_MAX_AMP_ERR <max_err> Default value is 2.0dB. | |
| **DISK_FULL_WARN_TIME** | Threshold time for issuing a warning event message alerting the user that at the current recording rate, the data disk will be full in the specified number of minutes.<br>SET DISK_FULL_WARN_TIME <minutes> Default value = 60. Range = 1 to 1440. | |
| **FFT_BIN_JUMP** | Thresholds for determining signal detection.<br>SET FFT_BIN_JUMP <#> Default value = 6, Range = 0 to 32768 | |
| **FFT_BW_LIMIT** | Sets a limit on what portion of the passband is valid for signal detection.<br>SET FFT_BW_LIMIT <#> Defualt value = 0.85, Range = 0 to 1.0 | |
| **FGAIN_AUTO_MEM_MODE** | Sets a flag to determine whether or not the calculated results of an automatic fgain are stored in memory to use as defaults for reconfigured channels.<br>SET FGAIN_AUTO_MEM_MODE <TRUE \| FALSE> Defualt value = FALSE | |
| **HIST_2BIT_HIGH_LIMIT** | Warning limit for distribution of noise points.<br>SET HIST_2BIT_HIGH_LIMIT <#> Default = .7, Range = 0. To 10000.0 | |
| **HIST_2BIT_LOW_LIMIT** | Warning limit for distribution of noise points.<br>SET HIST_2BIT_LOW_LIMIT <#> Default = .3, Range = 0. To 10000.0 | |
| **HIST_CLIPPING_LIMIT** | High threshold for fraction of points contained in peak bins of histogram.<br>SET HIST_CLIPPING_LIMIT <#> Default = .07, Range = 0. to 1.0 | |

| CONFIG. ITEM | SET DESCRIPTION | XREF |
|---|---|---|
| **HIST_LOW_PEAK_LIMIT** | Low threshold for peak bin of histogram.<br>SET HIST_LOW_PEAK_LIMIT <#> Default = .25, Range = 0. To 1.0 | |
| **IF_PATH** | A string describing the IF signal path. This string along with dss id and RF band from predicts is used for IFS AUTO. This string is typically used to indicate VRD output port (RCP,LCP).<br>SET IF_PATH {R \| L}CP Default value is "RCP". | |
| **RF_TO_IF_LO** | The RF to IF LO used by the mdls code to calculate baseband frequencies. If value left at 0 the software sets it based on the DOWNLINK_BAND from predicts and the following values: L = 1200, S = 2000, X = 8100, Ka = 31700 MHz<br>SET RF_TO_IF_LO <MHz> Default value is 0. | |
| **RT_DP_TIME_DIFF** | If the dp time is off by more than this value a warning will be issued.<br>SET RT_DP_TIME_DIFF <sec> Default is 2. Sec. | |

## 2.2 Operator Directives - Detailed Description

### 2.2.1 Unix Commands – Detailed Description

Operator Directives - Quick Reference

| **aldev** | Show the Allan Deviation of the data in a VSR recording |
|---|---|
| | |
| DESCRIPTION | aldev is a command issued in the UNIX window that computes and plots the Allan Deviation for a VSR data file. |
| SYNTAX | **aldev [ -a ] [ -f ] [ -s <time> ] <bls file name> [ total time ]**<br>where options are:<br>-a Show a plot of the average frequencies over 1-second intervals<br>-f Show a plot of the FFT amplitude fo the first 1-second record used<br>-s {time} Specify how many seconds into the BLS file before processing (default = 0)<br>**< bls file name> -** specifies the name of a BLS file, found using bls_ls<br>[ total time ] – specifies the number of 1-second records to process (default: to end of file) |
| EXAMPLES | **aldev -a 5 v2Ac1N1s053d14p0359n002tS.02-172-175406 2050** |
| NOTES | The aldev command can be executed at any time from the UNIX window and can be used on an BLS file that is open and recording data. It uses gnuplot to plot data (see figures 2.1, 2.2, 2.3).<br>In order to obtain meaningful results, the user should set up an experiment on the VSR with a single tone that maintains a constant average frequency, where the frequency will only change by the small variations that the Allan Deviation utility is trying to measure.<br>The Allan Deviation time interval (tau) is generated using powers of 2 (i.e.,: tau = 1,2,4,8,16,32 …). |

| **aldev** | Show the Allan Deviation of the data in a VSR recording |
|---|---|
| LIMITATIONS | Aldev only works on files that have been recorded with a bandwidth from 1 KHz to 100 KHz.<br>Values will be calculated whether or not a signal is present in the recording (i.e., noise only), or whether or not there is a frequency drift (see notes), both of which yield results that are not meaningful.<br>The last 3-4 points to the right on an Allan Deviation plot will not be accurate due to small averages. |
| RESPONSES | **aldev -afs 5 v2Ac1N1s053d14p0359n002tS.02-172-175406 600**<br>**********<br>* Allan Deviation Utility *<br>**********<br>BLS Filename: v2Ac1N1s053d14p0359n002tS.02-172-175406<br>Size in bytes: 51852720<br>Number of Records: 12172 (1 second each)<br>Prdx Sky Frequency: 8.415000e+09 Hz<br>Sample Rate: 1000 samples/sec<br>Bits Per Sample: 16<br>reading data / calculating...<br>Rectangular grid drawn at mx my mx2 my2 tics<br>Major grid drawn with linetype 0, linewidth 1.000<br>Minor grid drawn with linetype 0, linewidth 1.000<br>Program Run Time: 00:00:12<br>Allan Deviation Results:<br>----------<br>1 Sec Deviation: 1.0095e-13<br>2 Sec Deviation: 6.5718e-14<br>4 Sec Deviation: 3.8288e-14 |

| **aldev** | Show the Allan Deviation of the data in a VSR recording |
|---|---|
| | 8 Sec Deviation: 2.6663e-14<br>16 Sec Deviation: 1.8448e-14<br>32 Sec Deviation: 1.4471e-14<br>64 Sec Deviation: 8.7193e-15<br>128 Sec Deviation: 1.4248e-15<br>256 Sec Deviation: 1.9728e-15 |
| REJECTIONS | **Thu Nov 29 12:56:32 - (_db_load_volumes_) - Unable to open volume configuration file**<br>**Thu Nov 29 12:56:32 - (_db_load_volumes_) - /vsr/cfg/bls_config**<br>**bls_io: db_multi_open error**<br>**Error: bls file 'xxx' not found**<br>No file by this name was found<br>**Sample rate: xxx, too large – not to exceed 100kilo samples/sec.**<br>Can only process data with 100000 samples/sec bandwidth or less. |

| | |
|---|---|
| **aldev** | Show the Allan Deviation of the data in a VSR recording |

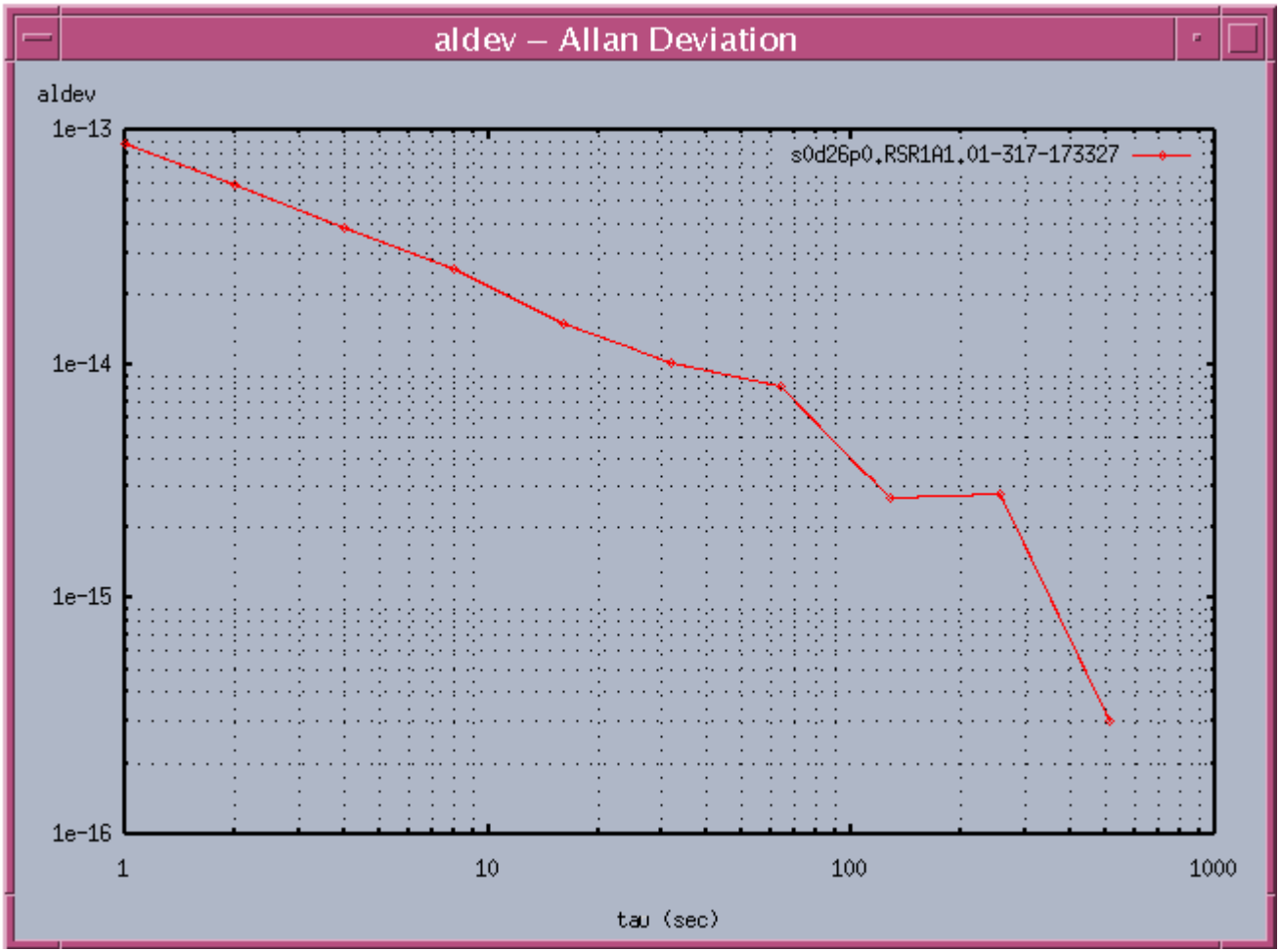


Figure 2-1 Plot of Allan Deviation

| | |
|---|---|
| **aldev** | Show the Allan Deviation of the data in a VSR recording |

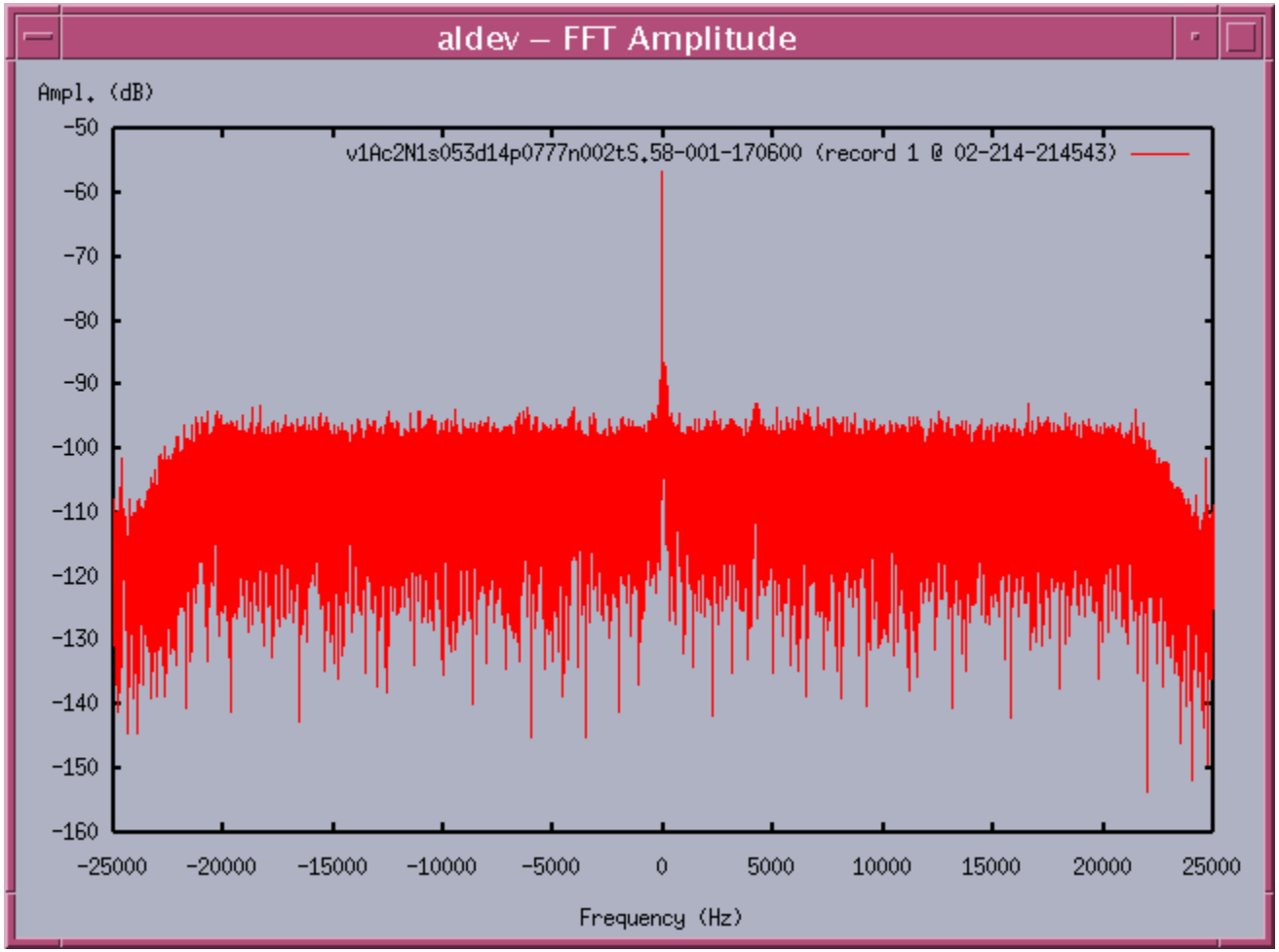


Figure 2-2 Plot of FFT amplitude

| | |
|---|---|
| **aldev** | Show the Allan Deviation of the data in a VSR recording |

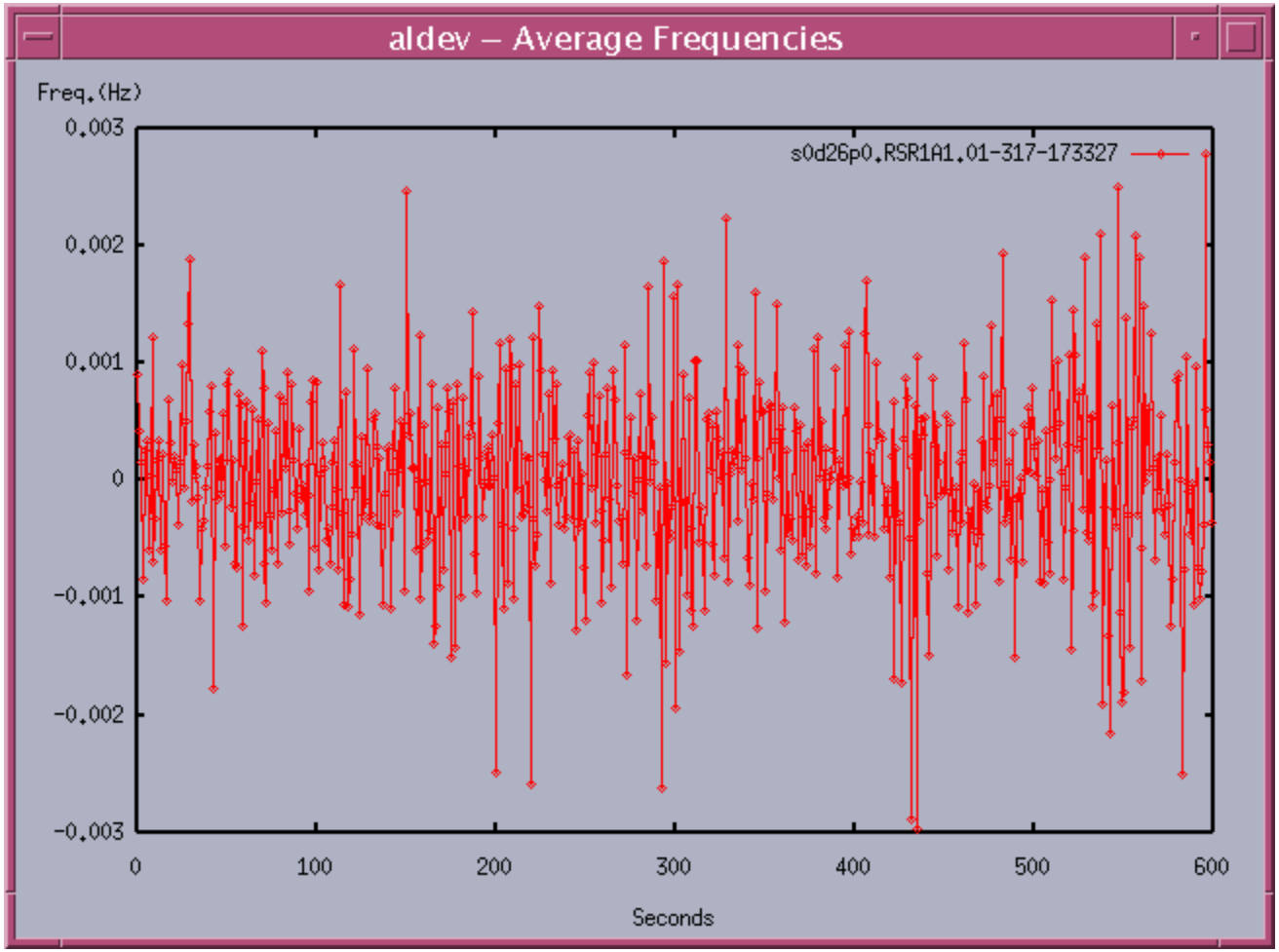


Figure 2-3 Plot of Average Frequencies over 1-second Intervals

| **bconnect** | Connect a GUI-based client to a VSR channel for observe-only use |
|---|---|
| | |
| DESCRIPTION | bconnect is a command issued in the UNIX window of the local client that brings up a GUI-based client on the workstation and connects it to the specified VSR channel at the SPC. This command is the same as gconnect except it is observe-only, does not allow most client directives to be executed and will not allocate or retain a VSR receiver. |
| SYNTAX | **bconnect <contact name> <contact phone#> <spc#> VSR<xx>**<br>where:<br>**<contact name>** - specifies the name of experimenter<br>**<contact phone#>** - specifies the phone# of who to "yell at" if a problem occurs (only one blank)<br>**<spc#> -** specifies the DSN complex; **spc**# = 10, 21 (DTF21), 40 or 60<br>**<xx>** - specifies an VSR channel; xx = 1a, 1b, 2a, 2b |
| EXAMPLES | **bconnect johndoe 818-3543303 10 VSR1b**<br>Specifies that channel VSR1b at SPC 10 be connected to the observe-only client johndoe at phone number 818-354-3303. |
| NOTES | If no GUI appears, the network between the client and the VSR is not connected or the VSR is not responding. There is no timeout, enter a **^C** to close the window. The contact name of a bconnect client listed using WHOIS will be pre-pended with an asterisk (*). |
| LIMITATIONS | After connecting, any client directives issued will be discarded with the exception of DISC, EVT and D. |
| RESPONSES | **Welcome client #n! COMPLETED**<br>The directive has been accepted a GUI window appears and the connection process initiated. The client id is #n.<br>**Contacting ….**<br>The connection process is not advancing if the tclient window is not replaced with the GUI. |

| **bconnect** | Connect a GUI-based client to a VSR channel for observe-only use |
|---|---|
| | |
| REJECTIONS | **VSR1 at 21 is unavailable, function is “DIAG”**<br>**No status available for VSR2A at 21**<br>**New Connect Failed!**<br>The VSR is in diagnostic mode |

| **bls_ls** | List data files and sizes |
|---|---|
| | |
| DESCRIPTION | bls_ls is a command issued in the UNIX window that scans through the data disks and lists all bls file names, sizes and number of free blocks. |
| SYNTAX | **bls_ls [-h <host>] [-a] [-q] <pattern>**<br>where options are:<br>-h {host} Host where BLS files reside<br>-a Show all files<br>-q Simple filename-only display |
| EXAMPLES | **bls_ls –h vsr2.gdscc** |
| NOTES | The bls_ls command can be executed at any time from the UNIX command window. |
| LIMITATIONS | None. |
| RESPONSES | v2Ac1N1s053d14p0359n002tS.02-172-175406 1945860 bytes<br>v2Ac1N3s053d14p0359n002tS.02-172-175406 19342260 bytes<br>v2Ac1W1s053d14p0359n002tS.02-172-175406 220143000 bytes<br>460413 index blocks total, 430339 index blocks free (93%) |
| REJECTIONS | None. |

| **bls_mv** | Rename a BLS file |
|---|---|
| | |
| DESCRIPTION | bls_mv is a command issued in the UNIX window that renames a BLS file. |
| SYNTAX | **bls_mv <old_bls_filename> <new_bls_filename>** |
| EXAMPLES | **vdr_mv v2Ac1N1s053d14p0359n002tS.02-172-175406 simple_filename**<br>Remane a data file to “simple_filename” |
| NOTES | The bls_mv command can be executed at any time from the UNIX command window but should not be used on an open file |
| LIMITATIONS | None. |
| RESPONSES | None. |
| REJECTIONS | Self Explanatory. |

| **bls_rm** | Remove bls files from data disks |
|---|---|
| | |
| DESCRIPTION | **bls**_rm is a command issued in the UNIX window that removes the named bls file from the data disks and index directory. |
| SYNTAX | **bls_rm [-h <host>] [-a] [-f] <pattern>**<br>where options are:<br>-h {host} Host where BLS files reside<br>-a Show all files<br>-f Force, do not prompt even if multiple files<br>pattern Files following the format <pattern> |
| EXAMPLES | **bls_rm v2Ac1N1s053d14p0359n002tS.02-172-175406** |
| NOTES | The bls_rm command can be executed at any time from the UNIX command window but should not be used on an open file. |
| LIMITATIONS | When using wildcards, (i.e.,: bls_rm *), single quotes should be included around the expression - '<pattern>*' or else the unix system will try to expand the expression rather than the BLS system. |
| RESPONSES | None |
| REJECTIONS | **bls_rm: no files specified for removal**<br>No file was given for removal |

| **gconnect** | Connect a GUI-based client to a VSR channel |
|---|---|
| | |
| DESCRIPTION | gconnect is a command issued in the UNIX window of the local client that brings up a GUI-based client on the workstation and connects it to the specified VSR receiver at the SPC. If the connection is being made for the first time, the receiver is allocated, VSR software is loaded and its state is set to cnf. |
| SYNTAX | **gconnect <contact name> <contact phone#> <spc#> VSR<xx>**<br>where:<br><contact name> - specifies the name of experimenter<br><contact phone#> - specifies the phone# of who to "yell at" if a problem occurs (only one blank)<br><spc#> - specifies the DSN complex; spc# = 10, 21 (DTF21), 40 or 60<br><xx> - specifies a VSR receiver; xx = 1a, 1b, 2a, 2b (and 3a, 3b at Madrid) |
| EXAMPLES | **gconnect joeshmoe 818-3543303 10 VSR1b**<br>Specifies that receiver VSR1b at SPC 10 be connected to the client joeshmoe at phone number 818-354-3303. |
| NOTES | If no GUI appears the network between the client and the VSR is not connected or the VSR is not responding. There is no timeout, enter a ^C to close the window. |
| LIMITATIONS | Must be issued from the UNIX command window where a VSR client has been installed. |
| RESPONSES | **Welcome client #n! COMPLETED**<br>The directive has been accepted a GUI window appears and the connection process initiated. The client id is #n.<br>**Contacting ….**<br>The connection process is not advancing if the tclient window is not replaced with the GUI. |

| **gconnect** | Connect a GUI-based client to a VSR channel |
|---|---|
| | |
| REJECTIONS | **VSR1 at 21 is unavailable, function is "DIAG"**<br>**No status available for VSR2A at 21**<br>**New Connect Failed!**<br>The VSR is in diagnostic mode |

| **sbuild** | Builds a VSR script for a Delta-DOR pass |
|---|---|
| | |
| DESCRIPTION | sbuild is a command issued in a UNIX window of the VSR dp server which builds VSR scripts out of a SPPA delivered VSR predicts file and the appropriate DOR configuration file found in the /vsr/sbuild/cfg directory.. |
| SYNTAX | **sbuild [-d] [-s <time>] vsr_predicts . . .**<br>where:<br>-d Indicates that the script data be dumped to "sbuild_log" in the current directory. This is used for debugging purposes only.<br>-s <time> Specifies that the VSR predicts should be shifted to current time + <time> seconds into the future when building the script. <time> can be negative or positive. |
| EXAMPLES | **sbuild p_snVA_srA_sc053_dss14_pn0123_clPV_tyV_py02_pd234**<br>Builds a script from the given SPPA-delivered VSR predicts file. |
| NOTES | Operationally, a VSR Predicts file is delivered to the /support/data/input directory on the VSR DP. The ftp daemon checks to see if any file delivered has the format "*.vp" or has "_clPV_tyV" in the name somewhere. If so, the ftp daemon moves this file into /vsr/sbuild/vp and starts sbuild to begin building a script from it. In the event that sbuild fails to build a script, an email message containing failure messages will be sent to the address specified in the VSR software installation precedure. Log files are generated for each run of sbuild and placed in /vsr/log with the format: **sbuild_log.<YY-DDD-HHMMSS>** |
| LIMITATIONS | The –d and –s options are only used if running sbuild by hand. Rarely will it need to be run by hand since it is designed to run automatically by the ftp daemon |
| RESPONSES | **Successful build of script 'p_sc053_pn1094_dss14_clPV_tyV_py02_pd234.scr'**<br>The script was successfully build and placed in /vsr/scripts |
| REJECTIONS | See notes |

| **scan** | Scan the VSRs at the specified SPC |
|---|---|
| | |
| DESCRIPTION | scan is a command issued in the UNIX window of the local client that scans through the VSRs at the specified SPC and returns a table giving the status of each VSR. |
| SYNTAX | **scan [<spc#>]**<br>where:<br><spc#> - specifies which SPC complex is to be scanned. Values: 10, 21 (DTF21), 40 or 60 |
| EXAMPLES | **scan 10**<br>Specifies that a scan is to be performed of the VSRs at SPC 10. |
| NOTES | The scan directive can be executed at any time from the UNIX command window. If no SPC # is entered all SCPs will be scanned and listed |
| LIMITATIONS | None. |
| RESPONSES | **Contacting "VSR1.mdscc.fltops.jpl.nasa.gov" at 137.228.204.139 ...**<br>**60 VSR1A is "s0p0d0XX"**<br>**60 VSR1B is available**<br>**…… ……** |
| REJECTIONS | Self explanatory |

| **tconnect** | Connect a text-based client to a VSR channel |
|---|---|
| | |
| DESCRIPTION | tconnect is a command issued in the UNIX window of the local client that brings up a text-based client on the users workstation and connects it to the specified VSR channel at the SPC. If the connection is being made for the first time, the channel is allocated, VSR software is loaded and its state is set to cnf. |
| SYNTAX | **tconnect [-y <email>] [-s <script path>] [-help] [-a <ddd/hh:mm:ss>] <contact name> <contact phone#> <spc#> VSR<xx>**<br>where:<br><[-y <email>] [-s <script path>] [-help] [-a <ddd/hh:mm:ss>]> - specifies yell, script, help and start time options respectively<br><contact name> - specifies the name of experimenter<br><contact phone#> - specifies the phone# of who to "yell at" if a problem occurs (only one blank)<br><spc#> - specifies the DSN complex; SPC# = 10, 21 (DTF21), 40 or 60<br><xx> - specifies a VSR channel; xx = 1a, 1b, 2a, 2b (and 3a, 3b at Madrid) |
| EXAMPLES | **tconnect janeshmoe 818-3543303 10 VSR1b**<br>Specifies that channel VSR1b at SPC10 be connected to the client janeshmoe at phone number 818-354-3303. |
| NOTES | The command can be installed as an @job with redirection to a script file for later execution |
| LIMITATIONS | Must be issued from the UNIX command window. Event notices are not color-coded for severity |
| RESPONSES | **Welcome client #n! COMPLETED**<br>The directive has been accepted and the connection process initiated. The client id is #n. |
| REJECTIONS | **VSR1 at 21 is unavailable, function is "DIAG"**<br>**No status available for VSR2A at 21**<br>**New Connect Failed!**<br>The VSR is in diagnostic mode |

| **vdr_dump** | Dump data files in ASCII format |
|---|---|
| | |
| DESCRIPTION | vdr_dump is a command issued in a UNIX window that allows the output of vdr data files in ascii format.. |
| SYNTAX | **vdr_dump [ options ] [ <filename> ]**<br>where options are:<br>-v Show verbose header (default: just time_tag)<br>-H {file} Send header output to {file}<br>-S {file} Send samples output to {file}<br>-x Output 32 bit VME_DATA words (in hex)<br>-b Output 8 or 16 bit binary I,Q samples<br>-r Output raw I,Q samples (in hex)<br>-s Output signed decimal I,Q samples<br>-d Like -s, with DC bias adjustment (default)<br>-n {n} number of I,Q samples printed per line<br><filename> The name of a file containing VSR data records (vdrs). |
| EXAMPLES | **vdr_dump -H headers.txt v2Ac1N1s053d14p0359n002tS.02-172-175406 > /dev/null**<br>Dump data samples to standard output, redirected, and put data headers in the file “headers.txt”. |
| NOTES | The input file was written using vdr_io. |
| LIMITATIONS | None. |
| RESPONSES | None |
| REJECTIONS | Self explanatory. |

| **vdr_io** | Transfer data files |
|---|---|
| | |
| DESCRIPTION | vdr_io is a command issued in a UNIX window that allows the streaming of data files. |
| SYNTAX | **vdr_io [ options ] <in_file> [ <out_file> ]**<br>read from in_file, write to out_file (default: stdout)<br>**or: vdr_io -s [ options ] <in_file>**<br>scan headers for timestamps, providing key summary only<br>where options are:<br>-S Suppress output of key summary<br>-f {time} First timestamp (dd/hh:mm:ss)<br>-l {time} Last timestamp<br>-n {count} Maximum number of records<br>-O Overwrite output file contents (default: append)<br>Note that a filename of the form "{host}:{file}" is taken to be<br>a BLS file on {host}, a filename of the form ":{file}" is taken<br>to be a BLS file on the local host, and a filename of "-" means<br>stdin or stdout:<br><in_file> is the name of the BLS or vdr file that vdr_io reads from<br><out_file> is the name of the vdr file that vdr_io writes to |
| EXAMPLES | **vdr_io :vsr1 other_filename**<br>Read a BLS file “vsr1”, and write vdrs to local non-BLS file “other_filename” |

| **vdr_io** | Transfer data files |
|---|---|
| | |
| NOTES | If "-f {time}" is in the future, the command will wait until that time before opening "in_file". Also, if "in_file" is a BLS file which is currently being written, the command will wait for and accept new records as they become available, terminating only when (1) a record later than "-l {time}" is received, (2) the number of records specified by "-n {count}" is received, or (3) the writer closes the file. |
| LIMITATIONS | None. |
| RESPONSES | None |
| REJECTIONS | Self explanatory. |

| **vsr_jobs** | Get a listing of the scheduled jobs |
|---|---|
| | |
| DESCRIPTION | vsr_jobs is a command issued in the UNIX window of the remote server that gives a listing of the VSR jobs scheduled to run in the future that were scheduled using the –s and –a options of tconnect. |
| SYNTAX | **vsr_jobs** |
| EXAMPLES | **vsr_jobs**<br>Get a listing of the jobs for vsr1a and vsr1b |
| NOTES | The vsr_jobs command can be executed at any time from the UNIX command window. All jobs relating to the VSR will be listed (ie: for VSR1A and VSR1B). If no jobs are scheduled, no response will be issued. |
| LIMITATIONS | Unlike scan, this command must be run on a particular VSR server and will only provide information about the jobs on that server |
| RESPONSES | **04/300 12:00:00 joeshmoe@818-354-3303 'script1' vsr1a**<br>**04/300 12:30:00 joeshmoe@818-354-3303 'script2' vsr1b** |
| REJECTIONS | None. |

### 2.2.2 Client Directives – Detailed Description

Display Client Directives - Quick Reference

| **ATT** | Set VSR attenuator |
|---|---|
| | |
| DESCRIPTION | ATT is a directive which manually or automatically sets the attenuator in the connected VSR. |
| SYNTAX | **ATT {<atten> \| {AUTO [ < desired_amp>]}}**<br>where:<br><atten> \|auto - specifies the attenuator setting in dB. Range: 0.0-31.5. If AUTO is specified, the attenuator level is set based on power measurements of the IF noise level determined by the VSR.<br>**< desired_amp> -** specifies the desired level, the default is –10.0 dB. |
| EXAMPLES | **ATT 20.0**<br>Specifies that the attenuator will be set to 20.0 dB. |
| DIALOG GUI | Figure 2.4 shows the ATT Dialog, which is part of the VSR CNF GUI. Select "Auto" or select "New ATT" and enter a new value in the field provided. Pressing the "OK" button or a carriage return will send the directive, "Cancel" will abort. |
| NOTES | The ATT value is displayed on the VSR CNF display. The ATT directive can be used to adjust the attenuator setting that will be used. The user should understand that if the attenuator is changed while the VSR is running, it will cause a phase shift in the recorded signal. Takes about 10 seconds to execute. |
| LIMITATIONS | None |
| RESPONSES | **ATT auto COMPLETED.**<br>The attenuator was valid |
| REJECTIONS | **ATT att# FAILED: INVALID ATT VALUE**<br>Invalid value used for att#. |

| | |
|---|---|
| **ATT** | Set **VSR** attenuator |

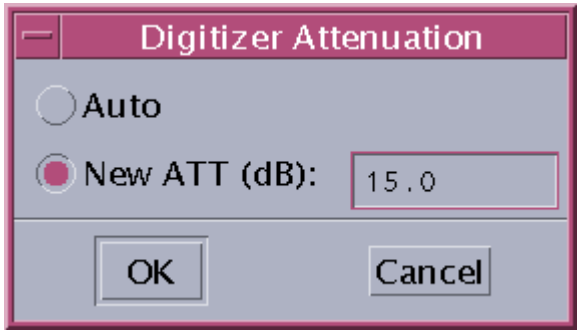


Figure 2-4 ATT Dialog

| **AVAIL** | Check for available disk space |
|---|---|
| | |
| DESCRIPTION | The AVAIL directive checks to see if the amount of disk space entered is less than or equal to the amount available on the BLS disk array. |
| SYNTAX | **AVAIL {<Mbytes_required>}** |
| EXAMPLES | **AVAIL 28000**<br>Checks to see if there is 2.8Gbytes of disk space available for recording |
| NOTES | If given no arguments, this directive will return only the total available space |
| LIMITATIONS | None. |
| RESPONSES | **AVAIL COMPLETED : <number> Mbytes free**<br>The configuration is valid. |
| REJECTIONS | **AVAIL FAILED : <Mbytes_free> Mbytes free, <Mbytes_required – Mbytes_free> more required**<br>The amount of disk space required exceeds the amount available |

| **CHAN** | Configure Channel and subchannels |
|---|---|
| | |
| DESCRIPTION | The CHAN directive configures the subchannels to the desired mode, bandwidths and bits for 1-4 channels. |
| SYNTAX | **CHAN <L> {<bw_schanLMK>[ :<bits_schanLMK>]}…**<br>Where : L = 1,2,3,4 (number_chan) 'ALL'<br>M = N, W (for Narrow Band or Wide Band)<br>K = 1, 2<br><bw_schanLMK> - Sub Channel bandwidth in KHz for M='N', in MHz for M='W', or 'D' for Disable this subchannel. MK is N1, N2, W1 and W2, i.e., the last value is for schanLW2.<br><bits_schanLMK> - Number of bits per sample |
| EXAMPLES | **CHAN 4 1:16 4:8 2:2 16:1**<br>Configure Channel 4 subchannels with 1 kHz @ 16 bits, 4 kHz @ 8 bits, 2 MHz @ 2 bits and 16 MHz @ 1 bit. |
| DIALOG GUI | Figure 2.5 shows the Config ChansDialog, which is part of the VSR CNF GUI. Select the Bandwidth and Bits for each desired Schan. Pressing the "OK" button will send the directive, "Cancel" will abort. When launched, the Config Chans dialog will read the current configuration from monitor data and display it on the GUI. When the "Selected Bitrate" field shows higher than "Available Bitrate" field, a status color "WARNING" (yellow) will appear on the "Selected Bitrate" field as well as launching an error dialog if the "OK" button is pressed. |
| NOTES | The two VSR receivers share the available bitrate. See Table 2-1 for valid settings. |
| LIMITATIONS | CHAN is only valid in the configure state |
| RESPONSES | **CHAN 2 25:8 D 4:1 D COMPLETED : DDC CHAN BOARD ASSIGNED TO VSR CHAN 2**The configuration is complete. |
| REJECTIONS | **CHAN 2 250:8 4000:1 FAILED : MUST BE IN CNF STATE, CURRENT STATE = RUN**<br>VSR is not in CONFIGURED state. |

| **CHAN** | Configure Channel and subchannels |
|---|---|
| | |
| | CHAN 1 16000:2 FAILED : INVALID SCHAN CONFIG 16000:2<br>Not a valid chan configuration<br>**CHAN 3 16 16 16 16 Failed : REQUESTED RT->DP TRANSFER RATE EXCEEDS LIMIT**<br>Not sufficient bitrate available to complete request |

| **Schan Type** | **Allowed BW Values** | **Allowed Bit Values** |
|---|---|---|
| Narrow Band | 1, 2, 4, 8, 16, 50, 100 (KHz) | 8, 16 |
| Wide Band | 1. (MHz) | 1, 2, 4, 8 |
| Wide Band | 2. (MHz) | 1, 2, 4, 8 |
| Wide Band | 4. (MHz) | 1, 2, 4 |
| Wide Band | 8. (MHz) | 1, 2 |
| Wide Band | 16. (MHz) | 1 |

Table 2-1 Valid Settings for Channel's Subchannel Configuration

| CHAN | Configure Channel and Subchannels |
|---|---|

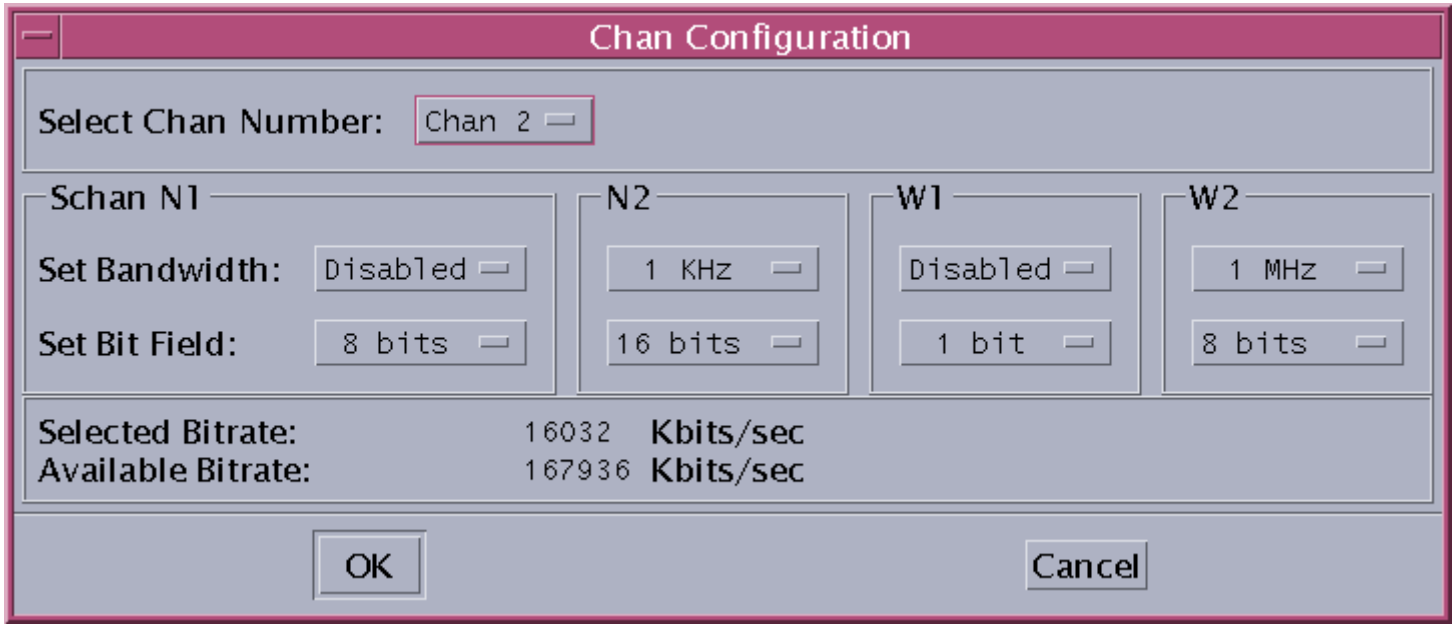


Figure 2-5 CHAN Dialog

| **D** | Launch a display |
|---|---|
| | |
| DESCRIPTION | D is used to launch VSR displays from NMC or gconnect interface. |
| SYNTAX | **D <display>**<br>Where:<br><display> - any of the 8 display types with appropriate identifiers :<br>CNF, CHAN<k>, FFT<kmn>, FTH<m>, HIST<kmn>, HISTADC, PTH<m>, STS (k= 1,2,3,4, m=N,W, n=1,2) |
| EXAMPLES | **D STS**<br>Launches theVSR status display of Channels and subchannels<br>**D FFT3W2**<br>Launches the FFT spectrum display" of Channel 3, subchannel W2 |
| NOTES | None |
| LIMITATIONS | Has no effect from a text client even though it will print "Executing". |
| RESPONSES | The specified display pops up. |
| REJECTIONS | **D dummy : DISPLAY "dummy" does not exist**<br>The entered value is not a recognized display |

| **DDCLO** | Set Digital Down Converter Local Oscillator for a channel to a given value |
|---|---|
| | |
| DESCRIPTION | DDCLO is used to set the DDCLO manually or to the value calculated from the predicts. |
| SYNTAX | **DDCLO {<chan#>} {<lo MHz> \| AUTO }**<br>Where:<br><chan#> is 1, 2, 3, 4 or ALL<br><lo MHz> - specifies the local oscillator value to use for the digitizer (265-375MHz)<br>AUTO - specifies that the predicts in current use are to be used to set the LO so that the subchannel filters are centered in the 16 MHz pass band. |
| EXAMPLES | **DDCLO 1 305**<br>Specifies that the local oscillator for channel 1 be set to 305 MHz. |
| DIALOG GUI | Figure 2.6 shows the DDCLO Dialog, which is part of the VSR CNF GUI. Select "Auto" or select "New DDCLO" and enter a new value in the field provided. Pressing the "OK" button will send the directive, "Cancel" will abort. |
| NOTES | None |
| LIMITATIONS | Limits are 265 to 375 MHz. If value is outside this range it will reject the directive. |
| RESPONSES | **ddclo 1 273 COMPLETED**<br>The channel 1 LO has been set |
| REJECTIONS | **ddclo 1 473 FAILED : INVALID DDCLO**<br>The entered value is outside range<br>**ddclo 3 273 FAILED : CHAN IS DISABLED**<br>The channel number specifies is not available to this VSR |

| | |
|---|---|
| **DDCLO** | Set DDC Local Oscillator to value given |

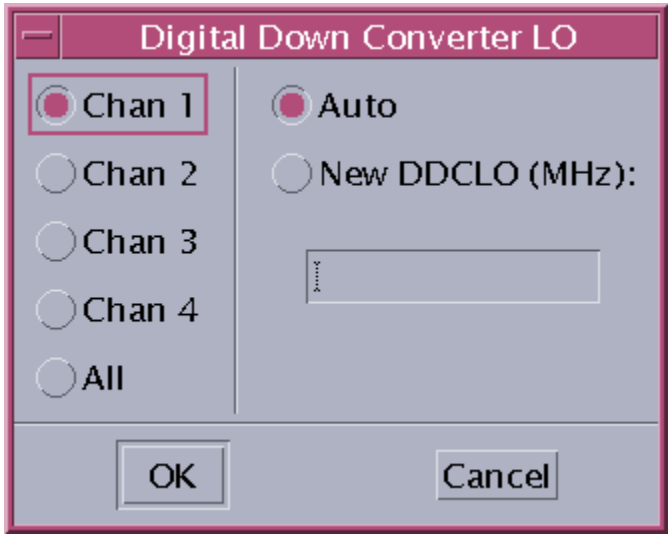


Figure 2-6 DDCLO Dialog

| **DISC** | Disconnect client from a VSR channel |
|---|---|
| | |
| DESCRIPTION | DISC is a directive that disconnects the client on the user workstation from the connected VSR channel shown in the window title. |
| SYNTAX | **DISC** |
| EXAMPLES | **DISC**<br>Specifies that the local client be disconnected from the active channel |
| NOTES | Though the client is disconnected the server is still active for this experiment_id, until a quit is issued or no clients are connected and the queue is empty.<br>If issued from the NMC, the client is automatically reconnected. |
| LIMITATIONS | None |
| RESPONSES | The window disappears.<br>The directive has been accepted and the disconnection process initiated. |
| REJECTIONS | None |

| **EVT** | Disable or Enable an event notice |
|---|---|
| | |
| DESCRIPTION | EVT is a directive that disables or enables a specified event notice for that client only. |
| SYNTAX | **EVT {E \| D \| YELL \| NOYELL} {# \| CRIT \| WARN \| DEV \| ALL }**<br>Where:<br>E\|D - specifies the state (enable or disable)<br>YELL \| NOYELL - specifies to include or not in email<br># - is the event notice number or ALL<br>CRIT \| WARN \| DEV \| ALL - specifies the severity to include or not in email |
| EXAMPLES | **EVT D 4**<br>Specifies that event notice number 4 is to be disabled from appearing in client command window.<br>**EVT YELL CRIT**<br>Specifies that only critical events will be emailed to address specified with YELL |
| NOTES | Event notices still show up in log file. If an event has been disabled it will not appear in the email.<br>The status color will still reflect all event notices. The response will spell out the event name. |
| LIMITATIONS | EVT D ALL should not be used. |
| RESPONSES | **EVT COMPLETED Event 42 HIST_LOW Disabled**<br>The directive has been accepted.<br>**EVT COMPLETED All events Disabled for yell**<br>The directive has been accepted.<br>**EVT COMPLETED All CRITICAL or higher events Enabled for yell** |
| REJECTIONS | **EVT FAILED: Event # out of range of 1 and 119** |

| **EXPID** | Set the experiment name for a pass |
|---|---|
| | |
| DESCRIPTION | The EXPID directive sets the "Expr ID:" field in the "VSR Status Info" portion of the CNF display to the specified text. This text also appears next to the corresponding VSR when a unix scan command is issued. |
| SYNTAX | **EXPID {<text> \| AUTO}** |
| EXAMPLES | **EXPID test_experiment**<br>Sets the eperiment name to "test_experiment" |
| NOTES | If EXPID has argument "auto", a text string of the form:<br>s<sc_id>p<pass_id>d<dss_id><upln_band><dnln_band><br>will be generated from the currently loaded predicts file. If EXPID is not set, the default experiment name will be "allocated". |
| LIMITATIONS | None. |
| RESPONSES | **EXPID <text> COMPLETED**<br>The experiment name was successfully set. |
| REJECTIONS | None. |

| **FFTHW** | Enable/Disable a Hanning Window used in generating the spectrum FFT. |
|---|---|
| | |
| DESCRIPTION | FFTHW is a directive which sets the number of data points to be used in an averaging interval for the specified sub-channel spectrum FFT. |
| SYNTAX | **FFTHW <sub-channel_id> <E\|D >**<br>where:<br><sub-channel_id> specifies the sub-channel spectrum to be effected, { <lmn> \| all} (l= 1,2,3,4, m=N,W, n=1,2)<br><E\|D > - specifies whether function is enabled or disabled |
| EXAMPLES | **FFTHW 1N2 E**<br>Specifies that the Hanning Window is enabled for the sub-channel 1N2 spectrum. |
| NOTES | None. |
| LIMITATIONS | None. |
| RESPONSES | **FFTHW 1W1 E COMPLETED**<br>The directive has completed. |
| REJECTIONS | **FFTHW 2 e FAILED: INVALID SCHAN**<br>Invalid VSR sub-channel.<br>**FFTHW FAILED: INVALID ARGUMENTS**<br>**FFTHW 4W2 FAILED : SCHAN IS DISABLED** |

| **FFTNA** | Set the number of FFT power spectra to be averaged for display |
|---|---|
| | |
| DESCRIPTION | FFTNA is a directive which, for the specified sub-channel, sets to the specified value the number of FFT power spectra to be added together to make one spectrum for display. |
| SYNTAX | **FFTNA <sub-channel_id> <#>**<br>where:<br><sub-channel_id> - specifies the effected sub-channel, {<lmn> \| all} (l= 1,2,3,4, m=N,W, n=1,2)<br><#> - specifies the number of FFT power spectra to be added together. |
| EXAMPLES | **FFTNA 1W2 10**<br>Specifies that in sub-channel 1W2, 10 spectra should be added together for a single spectrum. |
| NOTES | None. |
| LIMITATIONS | Minimum number of points is 1 and maximum is 524288/FFTNP. |
| RESPONSES | **FFTNA 1N2 10 COMPLETED**<br>The directive has completed. |
| REJECTIONS | **FFTNA 2W2 10000 FAILED: INVALID VALUE.**<br>**FFTNA 3 12: INVALID SCHAN**<br>Invalid VSR sub-channel.<br>**FFTNA 2W1 100 FAILED : SCHAN IS DISABLED** |

| **FFTNP** | Set the number of time points used in generating the spectrum FFT. |
|---|---|
| | |
| DESCRIPTION | FFTNP is a directive which sets the number of data points to be used in an averaging interval for the specified sub-channel spectrum FFT. |
| SYNTAX | **FFTNP < schan_id > <#points>**<br>where:<br><sub-channel_id> - specifies the effected sub-channel, {<lmn> \| all} (l= 1,2,3,4, m=N,W, n=1,2)<br><#points> - specifies the number of FFT points that will be used in generating the sub-channel spectrum. |
| EXAMPLES | **FFTNP 1N1 512**<br>Specifies that the number of FFT points will be 512 for subchannel spectrum #1. |
| NOTES | None. |
| LIMITATIONS | The #points will be rounded to the nearest factor of 2.<br>Minimum number of points is 64 and maximum is 32768/FFTZF. |
| RESPONSES | **FFTNP 1W1 512 COMPLETED**<br>The directive has completed. |
| REJECTIONS | **FFTNP sub-chan # FAILED : INVALID SCHAN**<br>**FFTNP sub-chan # FAILED: INVALID VALUE**<br>Invalid VSR sub-channel or value above 12287, or below 48<br>**FFTNP sub-chan # FAILED: SCHAN IS DISABLED** |

| **FFTTI** | Set the time interval between the start of FFT spectrum generation |
|---|---|
| | |
| DESCRIPTION | FFTTI is a directive which, for the specified sub-channel, set to the specified value the time interval between FFT spectrum generation. |
| SYNTAX | **FFTTI < sub-channel_id > <sec>**<br>where:<br><sub-channel_id> - specifies the effected sub-channel, {<lmn> \| all} (l= 1,2,3,4, m=N,W, n=1,2)<br><sec> - specifies the number seconds between FFT generation. |
| EXAMPLES | **FFTTI 2N1 10**<br>Specifies that in sub-channel 2N1, 10 seconds should be between FFT generation. |
| NOTES | None. |
| LIMITATIONS | None. |
| RESPONSES | **FFTTI sub-chan # COMPLETED.**<br>The directive has completed. |
| REJECTIONS | **FFTTI sub-chan # FAILED : INVALID SCHAN**<br>**FFTTI sub-chan # FAILED : INVALID VALUE**<br>Invalid VSR sub-channel or value above 10000.<br>**FFTTI sub-chan # FAILED : SCHAN IS DISABLED** |

| **FFTZF** | Set the zero fill factor for the spectrum FFT. |
|---|---|
| | |
| DESCRIPTION | FFTZF is a directive which sets the zero fill factor to be used, with the FFTNP, for generating the spectrum FFT. |
| SYNTAX | **FFTZF < schan_id > <#points>**<br>where:<br><sub-channel_id> - specifies the effected sub-channel, {<lmn> \| all} (l= 1,2,3,4, m=N,W, n=1,2)<br><#points> - specifies the zero fill factor. Normal range: 1, 2, 4, or 8; default is 4. |
| EXAMPLES | **FFTZF 1N1 4**<br>Specifies that the zero fill factor will be 4 for sub-channel spectrum 1N1. |
| NOTES | Maximum zero fill = 524288/FFTNP |
| LIMITATIONS | None. |
| RESPONSES | **FFTZF schan_id# COMPLETED.**<br>The directive has completed. |
| REJECTIONS | **FFTZF schan_id# FAILED: INVALID SCHAN**<br>Invalid VSR sub-channel.<br>**FFTZF schan_id# FAILED: INVALID VALUE**<br>Invalid Zero Fill Factor. |

| **FGAIN** | Signal strength information to use in gain setting for a subchannel |
|---|---|
| | |
| DESCRIPTION | FGAIN is a directive which sets the internal gain of a hardware filter sub-channel to make most use of the dynamic range of the hardware bits. It uses the estimated Pc/No and a multiplier parameter provided which gives direct linear control of the filter gain. |
| SYNTAX | **FGAIN < schan_id \| all > {{<Pc/No > [multiplier] } \| auto }**<br>where:<br>schan_id - specifies the effected sub-channel, {<lmn> \| all} (l= 1,2,3,4, m=N,W, n=1,2)<br>all – specifies all subchannels in all the channels<br>Pc/No - is an input estimated Pc/No range of +/- 100 dB-Hz<br>multiplier - is a floating point multiplier that adjusts the width of the bit usage. Default = 1.0, Range = 0 to 100000.<br>auto – specifies that the fgain will be calculated automatically if in the RUN state |
| EXAMPLES | **FGAIN 1N1 20.0**<br>Specifies that the internal gains of sub-channel 1N1 should be adjusted to work best with a Pc/No of 20 dB-Hz<br>**FGAIN ALL AUTO**<br>Specifies that all subchannels have their fgains calculated automatically<br>**FGAIN**<br>List the fgain values for all the active subchannels |

| **FGAIN** | Signal strength information to use in gain setting for a subchannel |
|---|---|
| | |
| DIALOG GUI | Figure 2.7 shows the FGAIN Dialog, which is part of the VSR CHAN# GUI. Select a subchannel and enter a new value in the field provided, or use the auto option. Pressing the "OK" button will send the directive, "Cancel" will abort. |
| NOTES | Fgain auto will be used to automatically correct incorrect filter gain settings while in the run state. In a pass, a single 'fgain all auto' command will take care of any problems in any of the running subchannels' filter gain adjustments. This command may take up to 30 seconds if there are 1kHz bandwidths configured, or may take as little as 8 seconds if all the subchannels are greater than 8kHz. |
| LIMITATIONS | The auto option can only be used in the RUN state since it relies on flowing fft data. The GUI dialog does not contain the 'ALL' option since this option refers to all channels. |
| RESPONSES | **FGAIN A 20 COMPLETED**<br>The filter gain of all subchannels was set using the estimated Pc/No of 20 and the default multiplier of 1.0. |
| REJECTIONS | **FGAIN FAILED : INVALID SCHAN**<br>The subchannel entered does not exist |

| | |
|---|---|
| **FGAIN** | Signal strength information to use in gain setting for a subchannel |

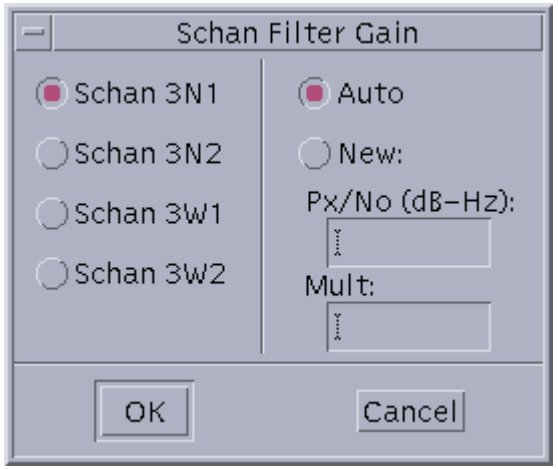


Figure 2-7 FGAIN Dialog

| **FRO** | Increment frequency offset to the predicts carrier frequency. |
|---|---|
| | |
| DESCRIPTION | FRO is a directive which adds the specified frequency to the VSR predicts carrier frequency offset (the offset accumulates). If the specified value is 0, then the carrier frequency offset is reset to zero. If a way is not entered, it uses the present value as default. |
| SYNTAX | **FRO <freq> [way]**<br>where:<br><freq> - specifies the frequency offset in Hz to be added to the predicts carrier frequency offset.. If 0 is specified, the predicts carrier frequency offset is returned to zero.<br>[way] - specifies whether to apply to 1-way or 2/3-way; <1 \| 2 \| 3> default is the current way. |
| EXAMPLES | **FRO 20.0**<br>Specifies that 20.0 Hz is to be added to the predicts carrier frequency offset. If there is an FRR value, the value of FRO will be updated every second. |
| DIALOG GUI | Figure 2.8 shows the FRO Dialog, which is part of the VSR CNF GUI. Select "1-Way" or "2/3-Way" and either select "Reset" (to 0.0) or "New Value". If "New Value", enter a value in the field for the selected Way. This dialog initializes to display the current tracking mode (1-Way or 2/3 Way). Pressing the "OK" button will send the directive, "Cancel" will abort. |
| NOTES | FRO 10 2<br>If no way is specified the offset will be applied to the current configuration. (command line only) |
| LIMITATIONS | If fro is too large - event notice SCHAN BASEBAND FREQ IS OUTSIDE +/-8 $MH_2$ RANGE |
| RESPONSES | **FRO #: FRO_2_3_WAY** = # (+ previous) **COMPLETED**<br>Fro # has been applied to appropriate predict points. |
| REJECTIONS | **FRO # # : FAILED: TRACKING MODE INVALID** |

| | |
|---|---|
| **FRO** | Increment frequency offset to the predicts carrier frequency. |

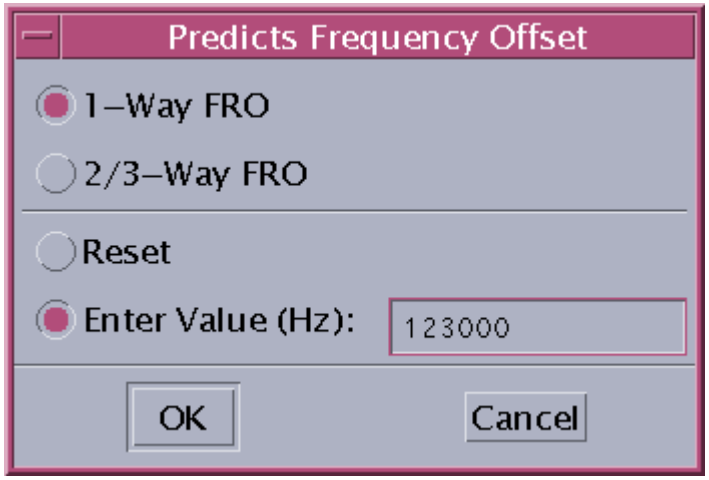


Figure 2-8 FRO Dialog

| **FROV** | Set sky frequency to be used instead of predicts, or reset. |
|---|---|
| | |
| DESCRIPTION | FROV is a directive which overrides the predicted carrier frequency. Set FROV to 0 to return to predicted frequencies. |
| SYNTAX | **FROV <RF frequency>**<br>where:<br>< RF frequency > - specifies the RF frequency setting in Hz. The range depends on the RF band. |
| EXAMPLES | **FROV 8456789000.0**<br>Specifies that the predicted RF frequency will be set to 8456789000. Hz. |
| DIALOG GUI | Figure 2.9 shows the FROV Dialog, which is part of the VSR CNF GUI. Select "Use Predicts File" or select "Override Predicts" and enter a new frequency in the field provided. Pressing the "OK" button will send the directive, "Cancel" will abort. |
| NOTES | The RF frequency is nominally derived from the downlink frequency predicts identified in the PRED directive. The override value is indicated in an event notice and displayed on the VSR display. |
| LIMITATIONS | For S Band limits are 2265000000 to 2375000000, for X Band 8365000000 to 8475000000,<br>For Ka Band 31965000000 to 32075000000. The predicts to be overridden must be for the same RF Band. |
| RESPONSES | **FROV # COMPLETED.**<br>The directive was sent to the processor |
| REJECTIONS | **frov 8375 FAILED : FREQ OVERRIDE OUT OF RANGE**<br>Invalid value used for FROV#, must be in Hz |

| | |
|---|---|
| **FROV** | Set sky frequency to be used instead of predicts |

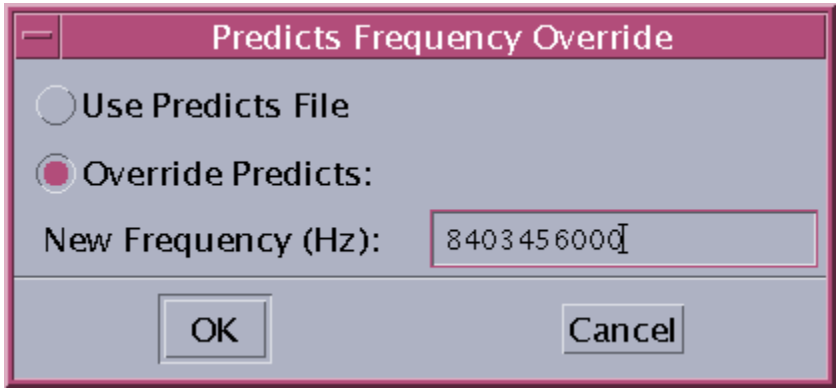


Figure 2-9 FROV Dialog

| **FRR** | Add a frequency rate to the predicted frequency. |
|---|---|
| | |
| DESCRIPTION | FRR is a directive which adds a frequency rate to the “predicted” carrier frequency of the current "way". |
| SYNTAX | **FRR <frequency rate>**<br>where:<br>< frequency rate > - specifies the frequency rate in Hz./sec. |
| EXAMPLES | **FRR 0.2**<br>Specifies that a rate of 0.2 Hz./sec. will be added to the “predicted” frequency |
| DIALOG GUI | Figure 2.10 shows the FRR dialog which is part of the VSR CNF GUI. Select “1-Way” or “2/3-Way” and either select “Reset” (to 0.0) or “New Value”. If “New Value”, enter a value in the field for the selected Way. This dialog initializes to display the current tracking mode (1-Way or 2/3 Way). Pressing the “OK” button will send the directive, “Cancel” will abort. |
| NOTES | The result of the rate addition will show in the display of the FRO value. The FRR value accumulates with each entry. |
| LIMITATIONS | The software does not check for limits on input but hardware will warn if resulting frequency is outside of its limits. |
| RESPONSES | **FRR : FRR_1_WAY = #** (+previous) **COMPLETED**<br>**FRR : FRR_2_3_WAY = #** (+previous**) COMPLETED.**<br>The directive was sent to the processor |
| REJECTIONS | None. |

| | |
|---|---|
| **FRR** | Add a frequency rate to the predicted frequency. |

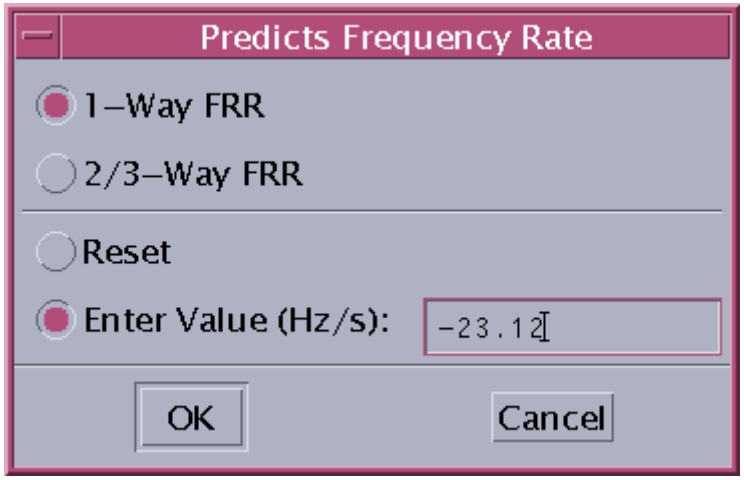


Figure 2-10 FRR Dialog

| **HALT** | Stop data processing, return VSR state to configured. |
|---|---|
| | |
| DESCRIPTION | HALT is a directive which stops the data processing in the VSR and returns the VSR state to Configured. |
| SYNTAX | **HALT** |
| EXAMPLES | **HALT**<br>Specifies that the connected VSR should stop data processing. |
| NOTES | Figure 2.11 shows the confirm/cancel dialog that will pop up when the halt button is pressed on the CNF GUI or the menu item “halt” is selected. This protects against the possibility of accidentally halting the VSR during a pass. |
| LIMITATIONS | The HALT directive is only valid in the Running state of the VSR. |
| RESPONSES | **HALT: COMPLETED.**<br>The directive has started. |
| REJECTIONS | None. |

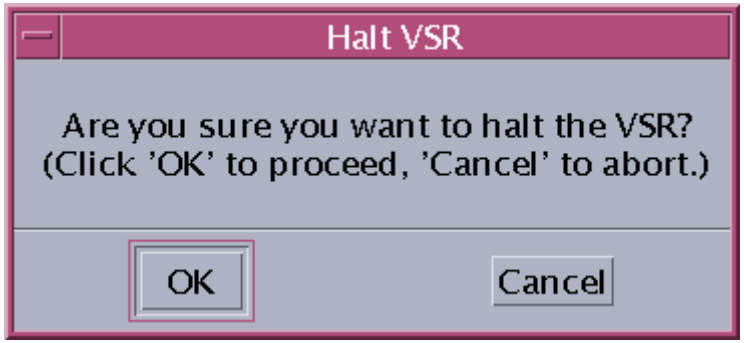


Figure 2-11 Halt Confirmation Dialog

| **HI** | Display current software ID |
|---|---|
| | |
| DESCRIPTION | HI is a directive which tests communications with the connected receiver. It returns the receiver number, the software version number and the date of compilation. |
| SYNTAX | **HI** |
| EXAMPLES | **HI**<br>Says HI to the connected receiver . |
| NOTES | The SPC and receiver of the VSR connected is in the client prompt. |
| LIMITATIONS | The HI directive is only valid if the client is connected to a VSR receiver |
| RESPONSES | **HI: I'm 10 VSR2B DVS-6130-OP A ,v 1.3 date hh/mm/ss COMPLETED** on remote client.<br>**COMPLETED: DVS-6130-OPAv 1.3 date** on NMC. |
| REJECTIONS | None. |

| **IFS** | Set VSR IF Switch to receive the IF signal from indicated source. |
|---|---|
| | |
| DESCRIPTION | IFS is a directive which sets the IF input source to the connected VSR. |
| SYNTAX | **IFS {<dss_band_polarization> \| AUTO }**<br>where:<br>< dss_band_polarization > - specifies the IF input source to be used.<br>AUTO – sets the switch using the dss from the predicts and the path from the if_path setting |
| EXAMPLES | **IFS 14_X_LCP**<br>Specifies that the if switch will be set to 14_X_LCP. |
| DIALOG GUI | Figure 2-12 shows the IFS Dialog, which is part of the VSR CNF GUI. Select "Auto" or select "New IFS" and enter the text in the field provided. Pressing the "OK" button will send the directive; "Cancel" will abort. |
| NOTES | The IFS directive can be used to change the source to the non default polarization (LCP, for 70 m. only) or to an antenna that has no predicts delivered. |
| LIMITATIONS | |
| RESPONSES | **IFS OUTPUT VSR## SET TO INPUT dss_band_polarization**<br>**IFS dss_band_polarization : COMPLETED.**<br>IF switch set by hardware<br>**SELECTED IFS IS_SOURCE_dss_band_polarization != PRDX IF_SOURCE 0_X**<br>Predicts do not match IF input |
| REJECTIONS | **IFS ERROR : 'OUT VSR## IN dss_band_polarization ' RETURNED ' connection: VSR## to dss_band_polarization not found**<br>**IFS dss_band_polarization FAILED : IFS_IF RETURNED ERROR**<br>Found invalid value used for dss_band_polarization when asked to set IF switch. |

| | |
|---|---|
| **IFS** | Set VSR IF Switch to receive the IF signal from indicated source. |

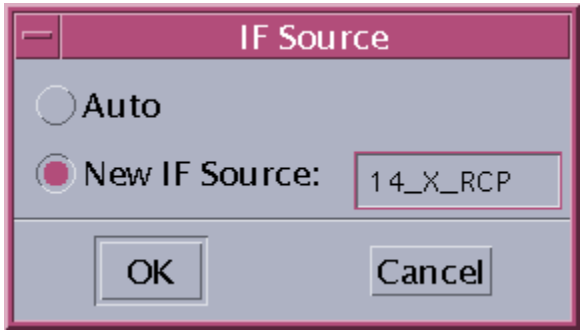


Figure 2-12 IFS Dialog

| **LOG** | Enter text into log file and client windows |
|---|---|
| | |
| DESCRIPTION | LOG is a directive which adds the included text line to the log file and any other client windows. |
| SYNTAX | **LOG < string >**<br>Where:<br>< string > is any text |
| EXAMPLES | **LOG Antenna to break**<br>**log Client 3, please print spectra for files** |
| NOTES | None. |
| LIMITATIONS | None |
| RESPONSES | **LOG string COMPLETED.**<br>The directive has completed. |
| REJECTIONS | None |

| **LOGFN** | Change log filenames |
|---|---|
| | |
| DESCRIPTION | LOGFN is a directive which changes both log file names in /vsr/log or any designated directory. |
| SYNTAX | **LOGFN < filename >**<br>Where:<br><filename > is any name for log file with optional pathname |
| EXAMPLES | **LOGFN /home/ops/093.test**<br>Sets the Log filename to “093.test” and puts it in the directory “/home/ops”. |
| NOTES | The default pathname will be /vsr/log if none supplied. |
| LIMITATIONS | Relative pathnames cannot be used. |
| RESPONSES | **log file rename to "/vsr/log/som.093" COMPLETED.**<br>**vrt log rename to "/vsr/log/vrt1_som.093" COMPLETE**<br>The directive has completed. |
| REJECTIONS | **ERROR OPENING FILE: /path/filename**<br>No write privileges in /path directory |

| **MKINF** | Make pass information file |
|---|---|
| | |
| DESCRIPTION | MKINF is a directive which takes the current log that is being generated by the current VSR running a pass, and copies lines preceded by "##" from the log file to a new info file. This info file provdes needed information to post-processing software. |
| SYNTAX | **MKINF <log filename> <info filename>**<br>Where:<br><log filename> is the name of the log file currently being generated by the VSR<br><info filename> is the name of the information file to build |
| EXAMPLES | **MKINF v2Ac000s053d14p0359n000tL.02-232-083000 v2Ac000s053d14p0359n000tI.02-232-083000**<br>Makes an info file out of a log file |
| NOTES | The default pathname for log and info files is /vsr/log. |
| LIMITATIONS | Relative pathnames cannot be used. |
| RESPONSES | The directive has completed. |
| REJECTIONS | **ERROR OPENING FILE: /path/filename**<br>No write privileges in /path directory |

| **NOTFY** | Notify playback system of datafile recording schedule |
|---|---|
| | |
| DESCRIPTION | The NOTFY directive sends a file of information to the DOR data playback system which contains the data filenames and record times used for post-processing. |
| SYNTAX | **NOTFY <info filename>** |
| EXAMPLES | **NOTFY v2Ac000s053d14p0359n000tI.02-232-083000** |
| NOTES | None. |
| LIMITATIONS | Notify must only be used after an info file has been created with MKINF. |
| RESPONSES | **NOTFY COMPLETED**<br>The playback system has taken responsibility for the data files |
| REJECTIONS | **NOTFY FAILED**<br>The playback system did not accept the notification |

| **PRED** | Load predicts from file and sets various configuration parameters |
|---|---|
| | |
| DESCRIPTION | The PRED directive loads a predict file named in the directive and sets the predict time if there is a prdx shift set. |
| SYNTAX | **PRED <predict_file> [ <prdx_shift>]**<br>where:<br><predict_file> is the predict path and file name with extension, if any. If the path is not specified,<br>/vsr/predicts is assumed.<br><prdx_shift> - is used to time shift the frequency predicts for testing. It should take one of three forms. "1234.56" - time shift predicts by number of seconds indicated. "CURRENT" - time shift predicts to current time now. "YY/DOY/HH:MM:SS" - time shift predicts to given time.<br>The default is "NONE" which indicates a time shift of 0 sec. |
| EXAMPLES | **PRED /vsr/cfg/X_prdx current**<br>Use the specified predict file and shift the times to start now, an event notice will be generated when the table is loaded. |
| DIALOG GUI | Figure 2-13 shows the PRED Dialog, which is part of the VSR CNF GUI. Select a filename from the "Predicts Files" list or manually enter the filename on the "Selection" line. Pressing the "OK" button will send the directive, "Cancel" will abort. |
| NOTES | Information in the predict's header is used for setting the IF switch (auto), link information, monitor data and output filenames. The default directory is /vsr/predicts. |
| LIMITATIONS | PRED is only valid in the cnf state |
| RESPONSES | **PRED <predict_file> COMPLETED**<br>The specified file has been loaded. |

| | |
|---|---|
| **PRED** | Load predicts from file and sets various configuration parameters |

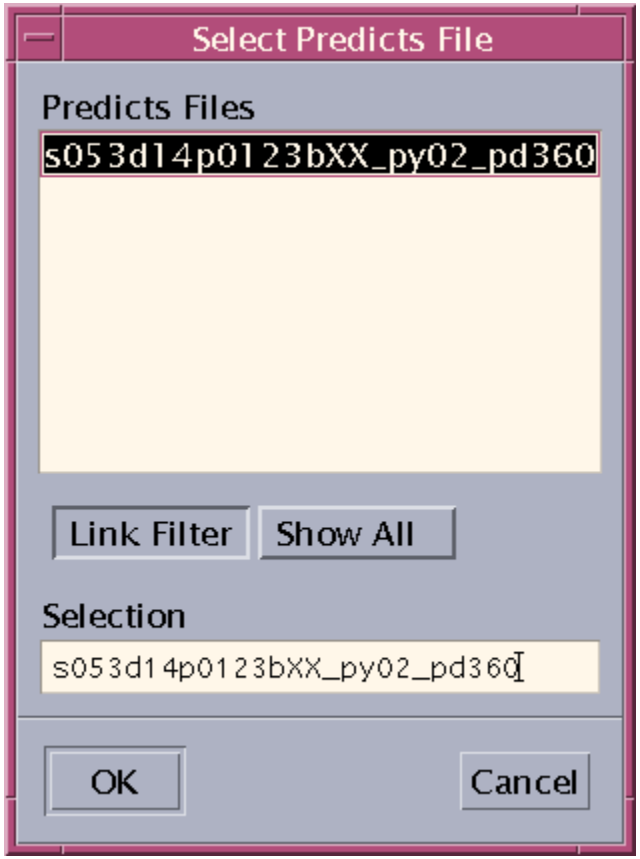


Figure 2-13 PRED Dialog

| **QUEUE** | Allow display and manipulation of the command queue |
|---|---|
| | |
| DESCRIPTION | QUEUE is a directive that allows the operator to display the command queue, and then to delete items or shift times. |
| SYNTAX | **QUEUE [{display \| delete \| shift}] [{more \| client \| relative-time \| NOW}] [<quentry>]**<br>**or Q**<br>Where:<br>display - asks for list in queue, will display 10 lines<br>delete - removes the client #'s quentry<br>shift - adds the relative time to all times in the queue, if NOW is entered, queue will start<br>more – displays next 10 lines after the previous queue display request<br>client - client # attached to quentry to be deleted<br>relative-time - see 6.2<br>quentry - entry sequence number of line to be deleted from queue |
| EXAMPLES | **QUEUE**<br>**Sending "queue"**<br>**01/093 22:14:17 EVENT(102): Q 093/22:15:00 1 10 22:15 ifs 25_k_rcp**<br>**01/093 22:14:17 EVENT(102): Q 093/22:20:00 1 11 22:20 set prdx_shift current**<br>**01/093 22:14:17 EVENT(102): Q 093/22:31:00 1 9 22:31 run**<br>The OD's were entered by client 1 and will execute in time order, the entry number is after the client number |
| NOTES | Default time increment for relative-time is seconds. If time of advance is already past the queue will start. If timed entries are in the future, wait until all previous non-timed entries have executed before entering QUEUE SHIFT NOW, otherwise this command will have no effect. Queue from script is combined with timed entries from the command line |

| | |
|---|---|
| **QUEUE** | Allow display and manipulation of the command queue |
| | |
| LIMITATIONS | If the day number is not entered, the closest one will be used, even if in the past. |
| RESPONSES | **QUEUE is empty** |
| REJECTIONS | **QUEUE: BAD PARAMETERS: CHECK VALUES FAILED :**<br>The parameters that were entered were of the wrong type or spelling. |

| **QUIT** | Terminate VSR channel processing, disconnect and quit client |
|---|---|
| | |
| DESCRIPTION | QUIT is a directive that forces the specified VSR channel into its booted state, disconnects and quits the client on the user workstation. |
| SYNTAX | **QUIT** |
| EXAMPLES | **QUIT**<br>Shuts down the VSR software |
| NOTES | All clients will be disconnected. Figure 2-14 shows the confirm/cancel dialog that will pop up when the quit menu item is selected from the GUI. This protects against the possibility of accidentally quitting the VSR during a pass. |
| LIMITATIONS | None. |
| RESPONSES | **Sending "quit"**<br>**The connection went away...**<br>The directive has been accepted and the quit process initiated. The client window will vanish. |
| REJECTIONS | None. |

| | |
|---|---|
| **QUIT** | Terminate VSR channel processing, disconnect and quit client |

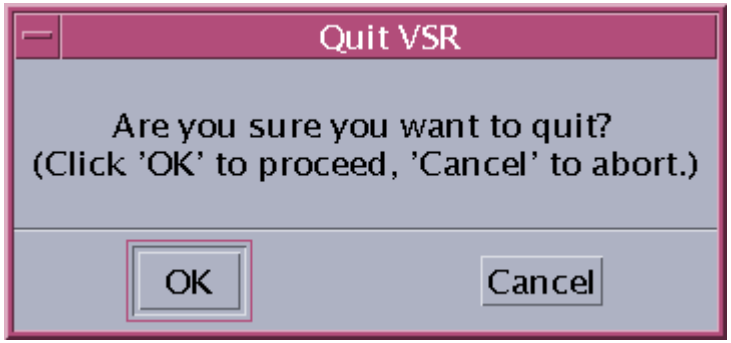


Figure 2-14 Quit Confirmation Dialog

| **REC** | Enable/disable the recording of data samples by the VSR |
|---|---|
| | |
| DESCRIPTION | REC is a directive which starts or stops the recording process. REC also has a dialog interface (see below). |
| SYNTAX | **REC <sub-channel> {E\|D}**<br>Where:<br><sub-channel> **-** specifies the sub-channel <1n1, 1n2, 1w1, 1w2 … \| all><br>{ E\|D } - specifies whether function is enabled or disabled |
| EXAMPLES | **REC 1w2 E**<br>Specifies that the data recording for subchannel 1w2 is to be started |
| DIALOG GUI | Figure 2-15 shows the REC Dialog, which is part of the VSR CHAN# GUI. Select a subchannel and select "Enable" or "Disable" to start or stop the recording respectively. Pressing the "OK" button will send the directive, "Cancel" will abort. |
| NOTES | If the sub-channel is not active the directive will say completed but recording will not start until it is active. |
| LIMITATIONS | None. |
| RESPONSES | **REC 1 E COMPLETED**<br>The directive has started and will complete when the sub-channel is running.<br>**SCHAN 1 FIRST RECORD 01/094 00:09:46.000**<br>The directive has completed and the recording has started. |
| REJECTIONS | **REC 5 E FAILED : INVALID SCHAN**<br>**REC 4 E FAILED : SCHAN 4 IS DISABLED** |

| | |
|---|---|
| **REC** | Enable/disable the recording of data samples by the VSR |

Figure 2-15 REC Dialog

| **RECFN** | Change filename for recording from default, or latest |
|---|---|
| | |
| DESCRIPTION | RECFN is a directive which changes the name of the file for subsequent data records to be written to. |
| SYNTAX | **RECFN < schan_id > <filename>**<br>where:<br><schan_id> - specifies the effected subchannel, {<lmn> \| all} (l= 1,2,3,4, m=N,W, n=1,2)<br><filename> - specifies the new data filename for recording |
| EXAMPLES | **RECFN 1N2 v1Bs053d43n001c1N2tQ.02-302-224400** |
| NOTES | |
| LIMITATIONS | No pathname can be input. |
| RESPONSES | **Data file rename to " v1Bs053d43n001c1N2tQ.02-302-224400" COMPLETED.**<br>The directive has completed. |
| REJECTIONS | **ERROR OPENING FILE: /path/filename**<br>Name will be changed but the RT program will abort if REC is attempted. |

| **RUN** | Start data processing; set VSR state to Run |
|---|---|
| | |
| DESCRIPTION | RUN is a directive which moves the VSR state into Run, and begins data processing. RUN also has a dialog interface (see below). |
| SYNTAX | **RUN** |
| EXAMPLES | **RUN**<br>Specifies that the connected VSR switches to the Run state. |
| NOTES | None |
| LIMITATIONS | The RUN directive is only valid in the Configured state of the VSR. |
| RESPONSES | **RUN COMPLETED**<br>The directive has executed. |
| REJECTIONS | **RUN FAILED : NO CHANNELS CONFIGURED** |

| **SCRPT** | Load script file |
|---|---|
| | |
| DESCRIPTION | SCRPT is a directive which loads the specified file in which there are times and/or untimed operator directives. These directives are placed on the VSR command queue and processed as though they were individually typed in from the keyboard. SCRPT also has a dialog interface (see below). |
| SYNTAX | **SCRPT <script_file> or . <script_file>**<br>where:<br><script_file> - specifies the name of the script file that is to be loaded. |
| EXAMPLES | **SCRPT /home/ops/script001.scr**<br>Specifies that the script file script001.scr be loaded. |
| DIALOG GUI | Figure 2-17 shows the Select Script Dialog, which is part of the VSR CNF GUI. Select a filename from the "Script Files" list or manually enter the filename on the "Selection" line. Pressing the "OK" button will send the directive, "Cancel" will abort. When in an NMC client connection, The script list can be filtered by clicking on the "Link Filter" button (engaged by default), which will only show scripts that have the same SC, DSS and PASS information embedded in their filename as the current link. This dialog also provides full pathname of the previous script loaded. |
| NOTES | The default directory for scripts is /vsr/scripts. See 6.2 for scripting. Scripts will be made automatically from Delta-DOR predicts delivered from NSS via SPPA. Figure 2-16 shows the Error dialog that will pop up when the script dialog is used to load a script when command queue is not empty. This will most likely pop up when the script for the pass has already been loaded If a new script must be loaded, first use the QUIT directive to reset the VSR, bring up a new CNF display, and select the correct script. |
| LIMITATIONS | The SCRPT directive is valid only if connected to a VSR in any state. Another script can not be loaded via the GUI if the previous one is not finished, or the command queue is not empty. The "Link Filter" and "Show All" buttons on the GUI Dialog are only visible in an NMC client. |
| RESPONSES | **Sending "SCRPT script_file".**<br>The directive has completed. |

| | |
|---|---|
| **SCRPT** | Load script file |
| | |
| REJECTIONS | **SCRIPT FAILED: INVALID COMMAND.**<br>**SCRPT FAILED: filename missing.**<br>**SCRPT xxx FAILED: No such file or directory**. |

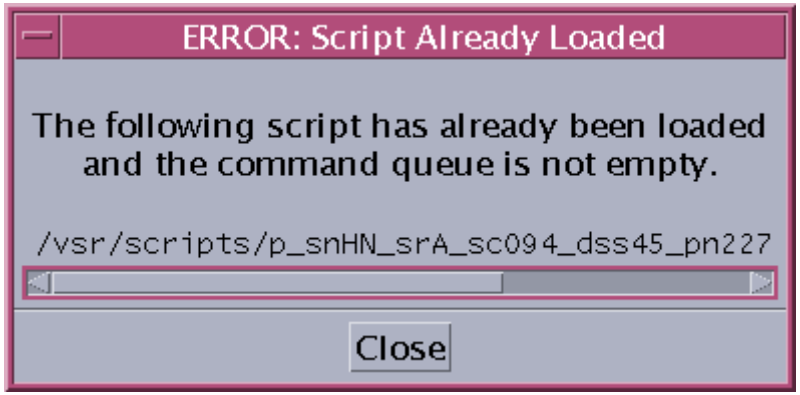


Figure 2-16 SCRPT Error Dialog

| | |
|---|---|
| **SCRPT** | Load script file |

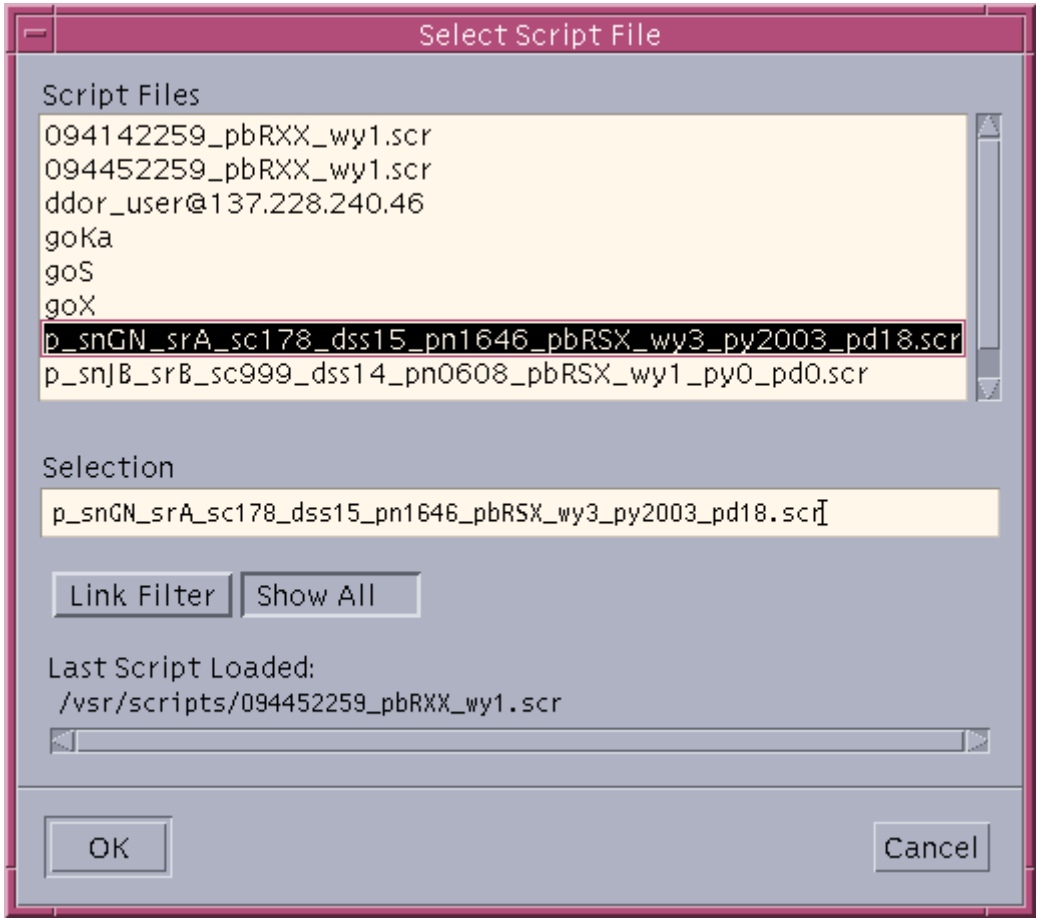


Figure 2-17 SCRPT Dialog

| **SDPLR** | Specify type of Doppler shift to apply |
|---|---|
| | |
| DESCRIPTION | SDPLR is a directive which specifies what type of Doppler correction to use for a Subchannel |
| SYNTAX | **SDPLR <schan id> < CARR \| 1WAY \| NONE >**<br>Where:<br><schan_id> is the Subchannel id (1N1, 1N2, 2W1…) |
| EXAMPLES | **SDPLR 1N2 CARR**<br>Set the Doppler correction applied to the tone in subchannel 1N2 to the same as is applied to the carrier (either NONE, CARR or 1WAY) |
| DIALOG GUI | Figure 2-18 shows the SDPLR, which is part of the VSR CNF GUI. Select a subchannel and then apply either “NONE”, “1WAY” or “CARR” Doppler to it. Pressing the “OK” button will send the directive, “Cancel” will abort. |
| NOTES | None. |
| LIMITATIONS | None |
| RESPONSES | **SDPLR 1N2 CARR COMPLETED** |
| REJECTIONS | |

| | |
|---|---|
| **SDPLR** | Specify type of Doppler shift to apply |

Figure 2-18 SDPLR Dialog

| **SET** | Set VSR channel configuration parameter. |
|---|---|
| | |
| DESCRIPTION | SET is a directive which is used together with the specified parameter and value to set the parameter in the internal configuration table. See 2.1.2. |
| SYNTAX | **SET <parameter> <parm_value>**<br>where:<br><parameter> - specifies the parameter to be set.<br><parm_value> - specifies the value to which the parameter is to be set. |
| EXAMPLES | **SET FFT_BIN_JUMP 10** |
| NOTES | |
| LIMITATIONS | The SET directive is only valid in Configured state unless used as a query. |
| RESPONSES | **SET < parameter> <parm_value> : < parameter> = <parm_value> COMPLETED.**<br>The directive has started.<br>**SET < parameter> : < parameter> = <parm_value> COMPLETED.**<br>The parameter and its value is listed. |
| REJECTIONS | **SET< parameter> <parm_value> FAILED : MUST BE IN CNF STATE, CURRENT STATE = run**<br>Cannot set any parameter in the present state. |

| **SFRO** | Set the frequency offset for a VSR sub-channel. |
|---|---|
| | |
| DESCRIPTION | SFRO sets the specified VSR sub-channel frequency offset to the specified frequency value. The offset is relative to the predicts carrier plus any FRO frequency offset that has been specified, including any rate. SFRO also has a dialog interface (see below). |
| SYNTAX | **SFRO <schan_id> <freq>**<br>where:<br><schan_id> - specifies the VSR subchannel that will be effected<br><freq> - specifies the frequency offset in Hz |
| EXAMPLES | **SFRO 3W2 20.0**<br>Specifies that the frequency offset of VSR subchannel 3w2 is to be set to 20.0 Hz. |
| DIALOG GUI | Figure 2-19 shows the SFRO Dialog, which is part of the VSR CHAN# GUI. Select a subchannel and enter a new value in the field provided. Pressing the "OK" button will send the directive, "Cancel" will abort. |
| NOTES | If SFRO puts the frequency out of baseband range the DDCLO will need to be changed |
| LIMITATIONS | The software will apply the sfro, even though it might be invalid for the circumstances. |
| RESPONSES | **SFRO # freq COMPLETED**<br>The directive has completed.<br>**SCHAN # BASEBAND FREQ 8467352.0 IS OUTSIDE +/- 8 MHz RANGE**<br>The freq value, added to the predicts, put the sub-channel outside the range of the baseband filter of the DDC<br>**SCHAN # IF FREQ 403458001.0 IS OUTSIDE 265-375 MHz RANGE**<br>The freq value, added to the predicts, put the sub-channel outside the range of the DDC LO |
| REJECTIONS | **SFRO X FAILED: Invalid SCHAN.**<br>Invalid VSR sub-channel.<br>**SFRO X 100000 FAILED : SCHAN X DISABLED** |

| | |
|---|---|
| **SFRO** | Sets the frequency offset for a VSR sub-channel. |

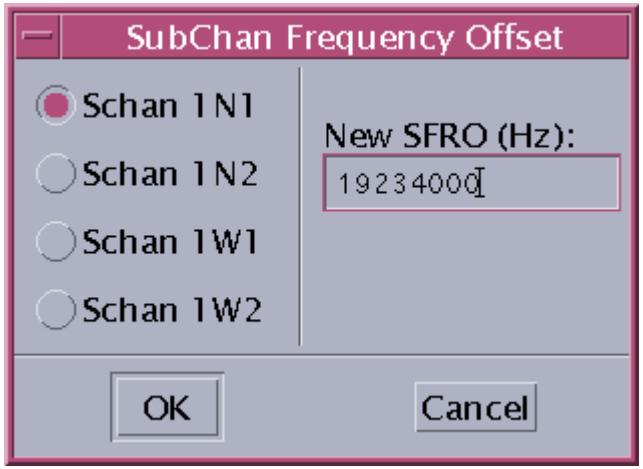


Figure 2-19 SFRO Dialog

| **SLBL** | Set a subchannel's label string |
|---|---|
| | |
| DESCRIPTION | SLBL is a directive which changes sets the label of a subchannel to the specified text. The text appears on status displays and plots corresponding to the subchannel specified. |
| SYNTAX | **SLBL <schan_id> <text>**<br>Where:<br><schan_id><br>**<**text**>** is any character string |
| EXAMPLES | **SLBL 1W1 QUASAR**<br>Set Subchannel 1W1's label to "Quasar" |
| NOTES | None. |
| LIMITATIONS | The string will consists of the first non-whitespace set of characters in <text> in which only 15 characters will be visible on the STS display. |
| RESPONSES | **SLBL 1W1 QUASAR COMPLETED.**<br>The directive has completed. |
| REJECTIONS | **SLBL 1W3 QUASAR FAILED : INVALID SCHAN**<br>subchannel 1W3 does not exist |

| **SRCID** | Set the Source ID field |
|---|---|
| | |
| DESCRIPTION | SRCID is a directive which changes sets the “Source ID:” field on the CNF display to the specified text. |
| SYNTAX | **SRCID <text>**<br>Where:<br><text> is any character string |
| EXAMPLES | **SRCID 053**<br>Set the Source ID string to “053” |
| NOTES | This directive is normally set automatically by a VSR script with the purpose of showing the operator which source (spacecraft or quasar) is currently being tracked. |
| LIMITATIONS | The string will consists of the first non-whitespace set of characters in <text> in which only 15 characters will be visible on the CNF display. |
| RESPONSES | **SRCID <text> COMPLETED.**<br>The directive has completed. |
| REJECTIONS | None. |

| **TDDC** | Test the digital down-converter |
|---|---|
| | |
| DESCRIPTION | TDDC is a directive which runs diagnostics on the DDC and reports if successful. |
| SYNTAX | **TDDC** |
| EXAMPLES | **TDDC**<br>Test the Digital Down-Converter |
| NOTES | This directive will take up to 1 minute to complete |
| LIMITATIONS | This directive only operates in the CNF state. |
| RESPONSES | **TDDC COMPLETED**<br>The DDC test has successfully completed. |
| REJECTIONS | **TDDC FAILED :** |

| **TDIG** | Test the digitizer |
|---|---|
| | |
| DESCRIPTION | TDIG is a directive which runs diagnostics on the DIG and reports if successful. |
| SYNTAX | **TDIG** |
| EXAMPLES | **TDIG**<br>Test the digitizer |
| NOTES | This directive will take up to 1 minute to complete |
| LIMITATIONS | This directive only operates in the CNF state. |
| RESPONSES | **TDIG COMPLETED.**<br>The DIG test has successfully completed. |
| REJECTIONS | **TDIG FAILED :** |

| **TPGM** | Turn the Test Pattern Generator Monitor on off |
|---|---|
| | |
| DESCRIPTION | TPGM is a directive which enables or disables the test pattern generator monitor. |
| SYNTAX | **TPGM [< AUTO \| OFF >]** |
| EXAMPLES | **TPGM AUTO** |
| NOTES | None. |
| LIMITATIONS | None. |
| RESPONSES | **TPGM [< AUTO \| OFF >] COMPLETED.**<br>The directive has completed. |
| REJECTIONS | **TPGM ON FAILED : INVALID TPGM ARGUMENT**<br>"ON" is not a valid argument |

| **TSF** | Sets the Test Synthesizer Frequency |
|---|---|
| | |
| DESCRIPTION | TSF is a directive which sets the test synthesizer frequency to the specified IF value in MHz. |
| SYNTAX | **TSF [<frequency (MHz)>]** |
| EXAMPLES | **TSF 300**<br>Set the test synthesizer frequency to 300 MHz |
| NOTES | |
| LIMITATIONS | Valid values range from 200 to 400 MHz in steps of 0.25 MHz |
| RESPONSES | **TSF [<frequency (MHz)>] COMPLETED.**<br>The directive has completed. |
| REJECTIONS | **TSF [<frequency (MHz)>] FAILED : INVALID TSF VALUE**<br>The value entered was out of range |

| **WAY** | Set WAY for choosing the correct subset of the carrier predicts |
|---|---|
| | |
| DESCRIPTION | WAY sets the specified WAY for determining which subset of carrier frequency predicts is to be used from the file chosen with PRED. |
| SYNTAX | **WAY <way> [<dss_id>]**<br>where:<br><way> - specifies the WAY to be used. <1 \| 2 \| 3><br><dss_id> - specifies the up-link station for 3-way. |
| EXAMPLES | **WAY 1**<br>Specifies that the WAY should be set to 1-way.<br>**WAY 3 15**<br>Specifies that the WAY should be set to 3-way with uplink from 15 |
| DIALOG GUI | Figure 2-20 shows the WAY Dialog, which is part of the VSR CNF GUI. Select either 1, 2, or 3-Way. Selecting "3-Way" requires an uplink DSS number (integer: 1-99) to be entered in the field provided. Pressing the "OK" button will send the directive, "Cancel" will abort. |
| NOTES | If the requested 3_way is not in the predicts set, the 2_way should be close enough for tracking. |
| LIMITATIONS | The requested 3_way must be in the predicts set in use. |
| RESPONSES | **WAY # dss_id : WAY = #_WAY/dss_id COMPLETED.**<br>The directive has completed for 3 way.<br>**way # : WAY = #_WAY COMPLETED**<br>The directive has completed for 1 or 2 way. |

| | |
|---|---|
| **WAY** | Set WAY for choosing the correct subset of the carrier predicts |
| | |
| REJECTIONS | **WAY # FAILED: TRACKING MODE INVALID**<br>WAY not in proper range.<br>**WAY <way>*<dss_id> FAILED: INVALID UPLINK DSS ID**<br>Should be no '*' between <way> and <dss_id><br>**WAY <way> <dss_id> FAILED : PRDX SEARCH FOR <way>/<dss_id> FAILED**<br>3 way predicts for this uplink dss were not found in the set. |

Figure 2-20 WAY Dialog

| **WHOIS** | Respond with information on a client or clients |
|---|---|
| | |
| DESCRIPTION | WHOIS is a directive which displays the information on the requested client on the connected VSR. |
| SYNTAX | **WHOIS [<#>]**<br>where:<br><#> - specifies the client number of interest |
| EXAMPLES | **WHOIS 2**<br>Answers with information on client #2. |
| NOTES | Any client connected to a VSR, except for benign (bconnect) clients, can issue OD's, etc. If a client is benign the contact name will be pre-pended with an asterisk (*). |
| LIMITATIONS | The **WHOIS** directive is only as informative as the original connecting command lines. |
| RESPONSES | **WHOIS: Client 1 is ops: contact at 165-829: active COMPLETED**<br>This is the information on the client requested<br>**WHOIS COMPLETED 1 client**<br>This information is added if no particular client was requested.<br>**WHOIS: Client 1 is *johndoe: contact at 111-222: active COMPLETED**<br>The name 'johndoe' is pre-pended by an asterisk indicating this is a benign (bconnect) client |
| REJECTIONS | **WHOIS FAILED : Client 22 was not found**<br>Invalid value used for #. |

| **YELL** | Set email address for sending event notices. |
|---|---|
| | |
| DESCRIPTION | YELL is a directive which specifies who gets email if YELL is set on EVT. |
| SYNTAX | **YELL { E \| D } <email@domain>**<br>where:<br>{ E\|D } - specifies whether function is enabled or disabled<br>email@domain - specifies the email address to receive the critical and warning messages gathered over each five minute interval. |
| EXAMPLES | **YELL E VSR-notify@godzilla.jpl.nasa.gov**<br>Error messages will be sent to this address |
| NOTES | A mail message will be sent to the RSOPS as well as entered address. |
| LIMITATIONS | The YELL directive will complete, even with a bogus address. |
| RESPONSES | **yell e ops@jpl.nasa.gov COMPLETED ADDRESS ENABLED**<br>**YELL D ops@bigwig.jpl.nasa.gov COMPLETED ADDRESS DISABLED** |
| REJECTIONS | **yell: NOT ENOUGH REQUIRED PARAMETERS ENTERED. FAILED :**<br>There is no query mode for YELL. |

## 2.3 Menus - Detailed Description

Each of the VSR displays CNF, CHAN# and STS, has a menu bar which contains pulldown menus. The pulldown menus are used to control the displays. The menu bar contains the Displays and Help menus as well as additional menus: Graphics and Directives.

Each menu item in the Display, Graphics, and Directives menus operates by sending a display ("D") directive to the NMC Workstation. The Help menu is used to display on-line help text on Netscape browser

### 2.3.1 Displays Pulldown Menu

The Displays pulldown menu, shown in Figure 2-21, contains the following items:

(1) **Configuration**: Click on this menu item to bring up a submenu which contains entries for configuration displays for the VSR

- Chan 1 Status (CHAN1): This menu item launches a CHAN1 display.
- Chan 2 Status (CHAN2): This menu item launches a CHAN2 display.
- Chan 3 Status (CHAN3): This menu item launches a CHAN3 display.
- Chan 4 Status (CHAN4): This menu item launches a CHAN4 display.
- VSR Configuration (CNF): This menu item launches a CNF display.

(2) **Calibration**: This menu item is not supported by the VSR.

(3) **Support Data:** This item is supported under the Help menu

(4) **Status/Performance**: Click on this menu item to bring up a submenu which contains entries for status displays for the VSR:

- BLS Status (BLS): This menu item launches a BLS display
- Main Status (STS): This menu item launches an STS display
- Chan 1 Status (CHAN1): This menu item launches a CHAN1 display.
- Chan 2 Status (CHAN2): This menu item launches a CHAN2 display.
- Chan 3 Status (CHAN3): This menu item launches a CHAN3 display.
- Chan 4 Status (CHAN4): This menu item launches a CHAN4 display.
- VSR Configuration (CNF): This menu item launches a CNF display.

(5) **Diagnostics**: This menu item is not supported by the VSR.

(6) **Alphabetical List**: This menu item contains the alphabetic list of all displays of the VSR and allows a selection from the list. Click on this item to pop up a dialog from which the user can choose any of the subsystem's displays.

(7) **Exit**: Choose this menu item to exit the current display.

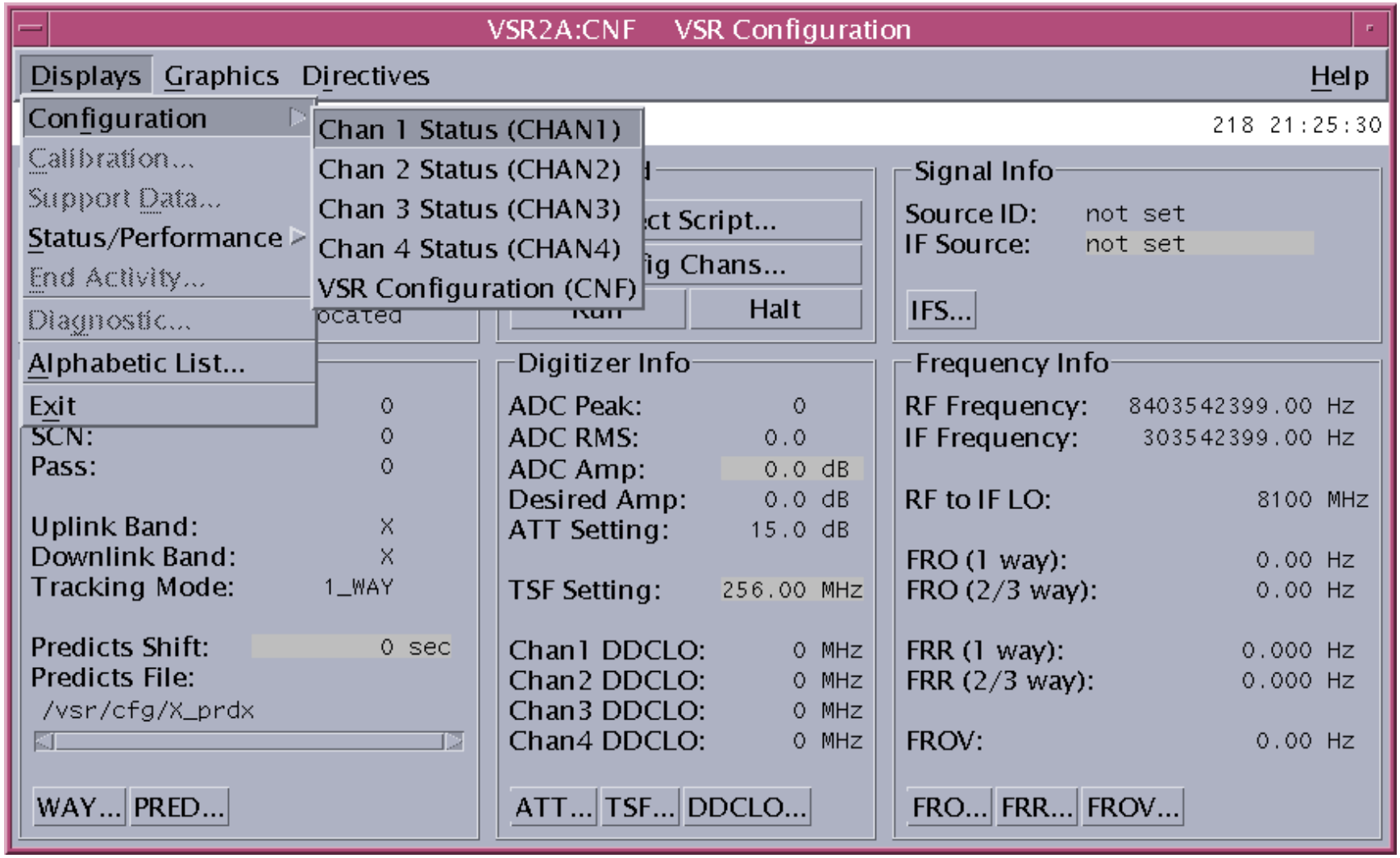


Figure 2-21 Displays->Configuration Menu

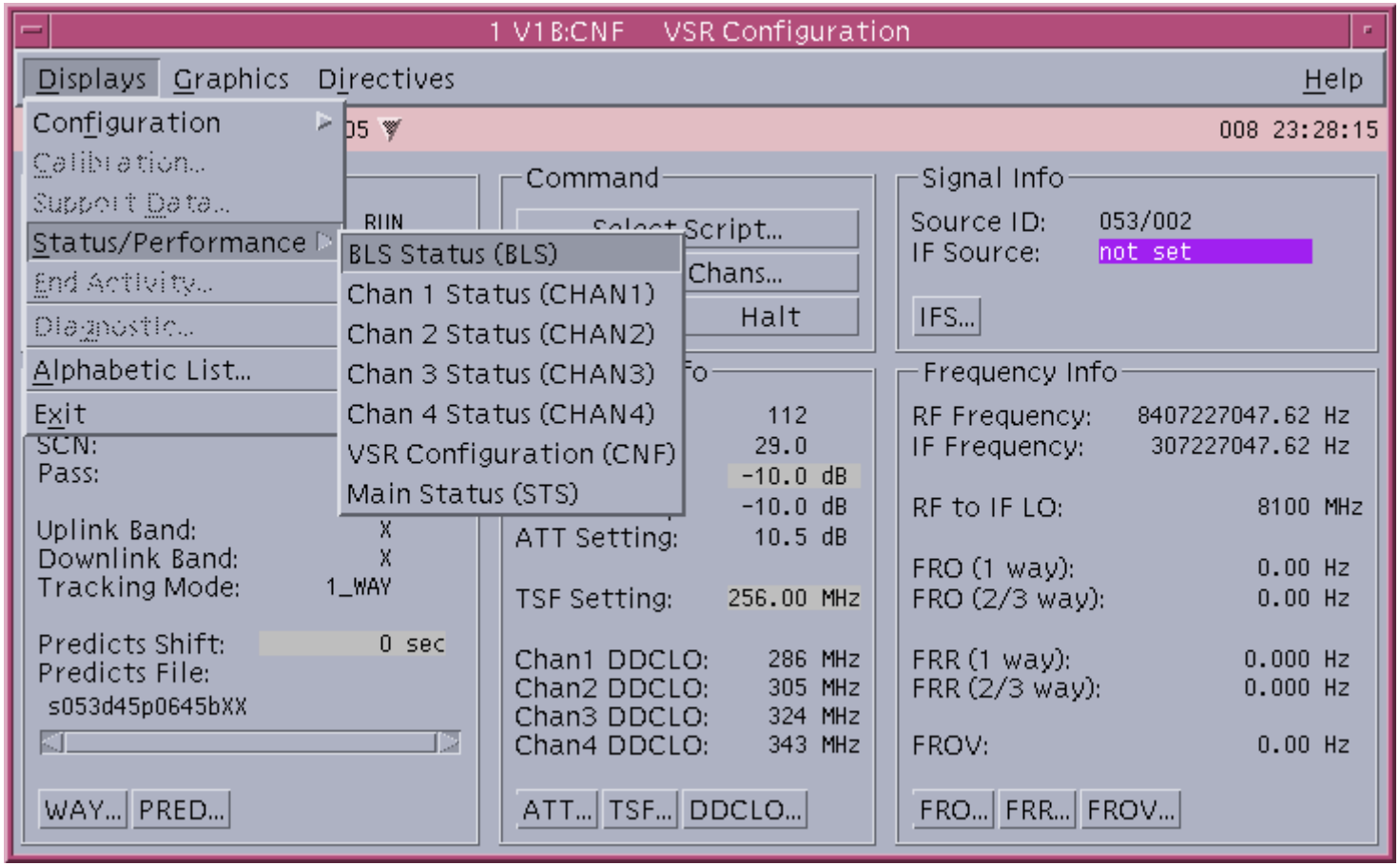


Figure 2-22 Displays ->Status/Performance Menu

### 2.1.3 Graphics Pulldown Menu

The Graphics pulldown menu, shown in Figure 2-23 and Figure 2-24, contains the following items:

(1) **Frequency Time History:** Click on this menu item to bring up a submenu which contains entries for selecting frequency time history plots for the VSR:

- FTHN: Click on this entry to activate the frequency time history plot for narrowband subchannels.
- FTHW: Click on this entry to activate the frequency time history plot for wideband subchannels.

(2) **Signal Power Time History:** Click on this menu item to bring up a submenu which contains entries for selecting Pc/No time history plots for the VSR:

- PTHN: Click on this entry to activate the Pc/No time history plot for narrowband subchannels.
- PTHW: Click on this entry to activate the Pc/No time history plot for wideband subchannels.

(3) **FFT Frequency Spectrum**: Click on this menu item to bring up a submenu which contains entries for selecting spectrum plots for the VSR:

- Schan 1N1 FFT: Click on this entry to activate Spectrum Plot for Schan 1N1.
- Schan 1N2 FFT: Click on this entry to activate Spectrum Plot for Schan 1N2.
- Schan 1W1 FFT: Click on this entry to activate Spectrum Plot for Schan 1W1.
- Schan 1W2 FFT: Click on this entry to activate Spectrum Plot for Schan 1W2.
- Schan 2N1 FFT: Click on this entry to activate Spectrum Plot for Schan 2N1.
- Schan 2N2 FFT: Click on this entry to activate Spectrum Plot for Schan 2N2.
- Schan 2W1 FFT: Click on this entry to activate Spectrum Plot for Schan 2W1.
- Schan 2W2 FFT: Click on this entry to activate Spectrum Plot for Schan 2W2.
- Schan 3N1 FFT: Click on this entry to activate Spectrum Plot for Schan 3N1.
- Schan 3N2 FFT: Click on this entry to activate Spectrum Plot for Schan 3N2.
- Schan 3W1 FFT: Click on this entry to activate Spectrum Plot for Schan 3W1.
- Schan 3W2 FFT: Click on this entry to activate Spectrum Plot for Schan 3W2.

- Schan 4N1 FFT: Click on this entry to activate Spectrum Plot for Schan 4N1.
- Schan 4N2 FFT: Click on this entry to activate Spectrum Plot for Schan 4N2.
- Schan 4W1 FFT: Click on this entry to activate Spectrum Plot for Schan 4W1.
- Schan 4W2 FFT: Click on this entry to activate Spectrum Plot for Schan 4W2.

(4) **Data Sample Histogram**: Click on this menu item to bring up a submenu which contains entries for selecting histogram plots for the VSR:

- Schan 1N1 Histogram: Click on this entry to activate the data histogram plot for Schan 1N1.
- Schan 1N2 Histogram: Click on this entry to activate the data histogram plot for Schan 1N2.
- Schan 1W1 Histogram: Click on this entry to activate the data histogram plot for Schan 1W1.
- Schan 1W2 Histogram: Click on this entry to activate the data histogram plot for Schan 1W2.
- Schan 2N1 Histogram: Click on this entry to activate the data histogram plot for Schan 2N1.
- Schan 2N2 Histogram: Click on this entry to activate the data histogram plot for Schan 2N2.
- Schan 2W1 Histogram: Click on this entry to activate the data histogram plot for Schan 2W1.
- Schan 2W2 Histogram: Click on this entry to activate the data histogram plot for Schan 2W2.
- Schan 3N1 Histogram: Click on this entry to activate the data histogram plot for Schan 3N1.
- Schan 3N2 Histogram: Click on this entry to activate the data histogram plot for Schan 3N2.
- Schan 3W1 Histogram: Click on this entry to activate the data histogram plot for Schan 3W1.
- Schan 3W2 Histogram: Click on this entry to activate the data histogram plot for Schan 3W2.
- Schan 4N1 Histogram: Click on this entry to activate the data histogram plot for Schan 4N1.
- Schan 4N2 Histogram: Click on this entry to activate the data histogram plot for Schan 4N2.
- Schan 4W1 Histogram: Click on this entry to activate the data histogram plot for Schan 4W1.
- Schan 4W2 Histogram: Click on this entry to activate the data histogram plot for Schan 4W2.
- ADC Histogram: Click on this entry to activate the ADC data histogram plot.

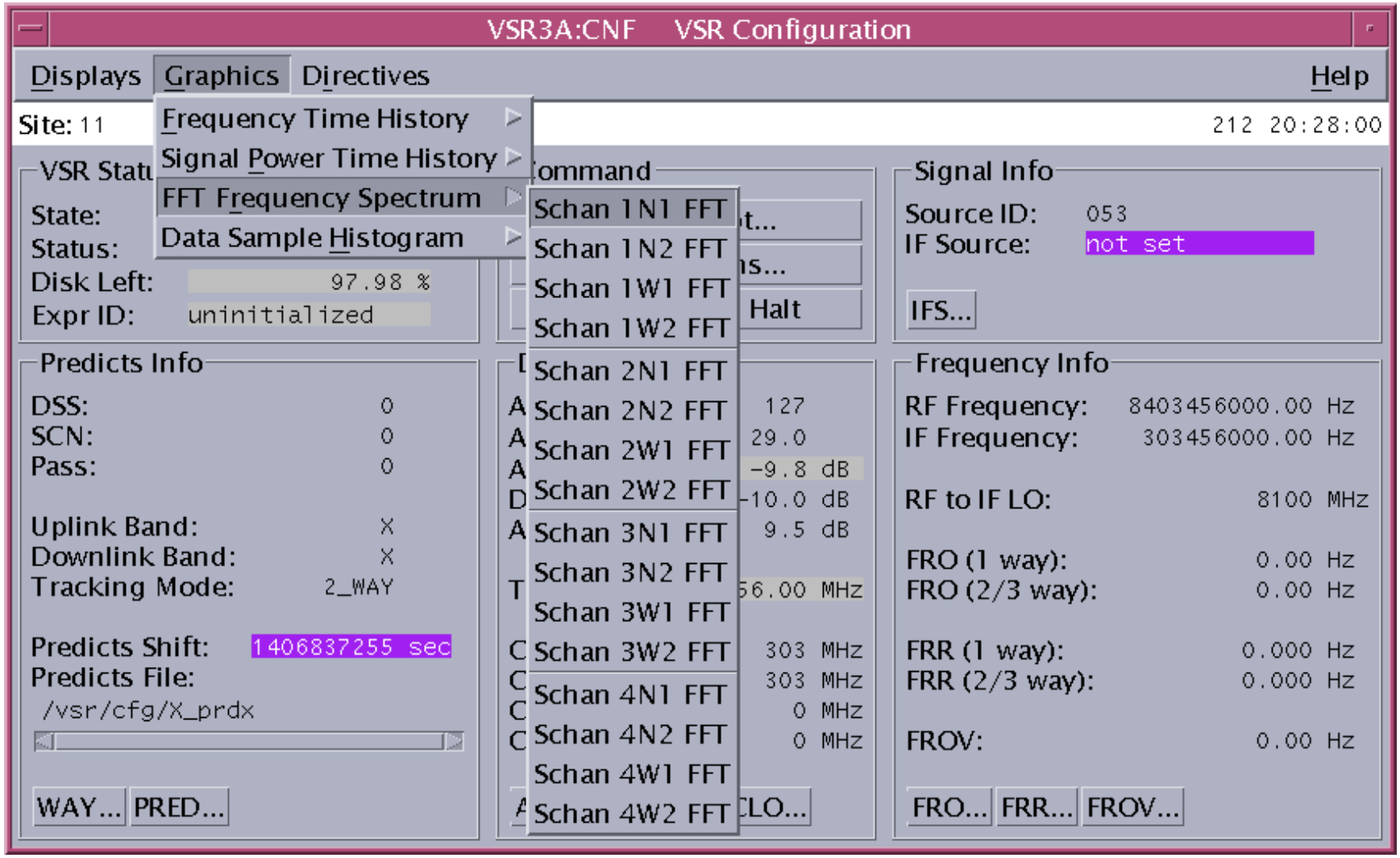


Figure 2-23 Graphics FFT Menu

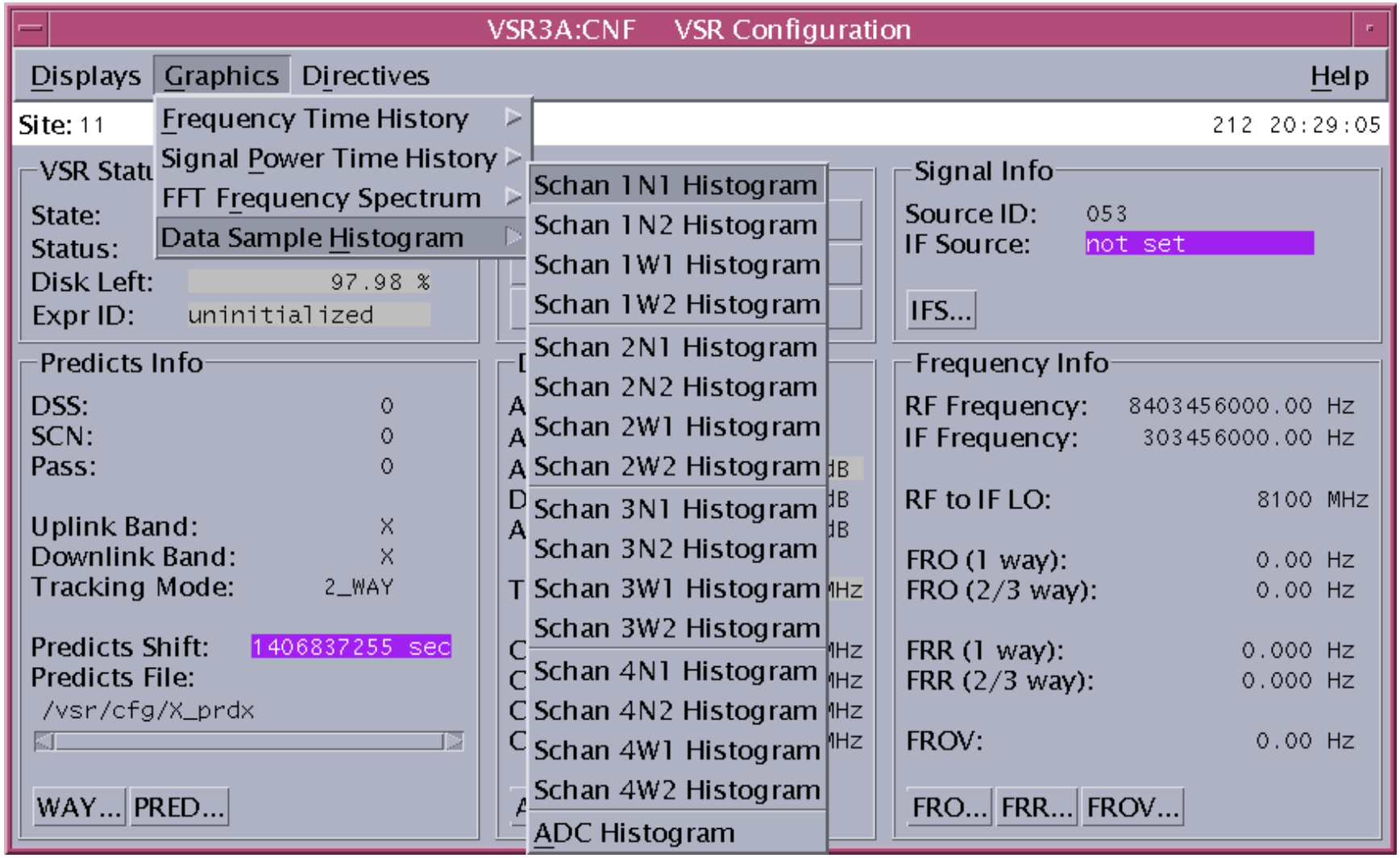


Figure 2-24 Graphics Histogram Menu

### 2.1.4 Directives Pulldown Menu

The Directives pulldown menu contains the following items:

(1) **Main**: Click on this menu item to bring up a submenu which contains these top-level **VSR** related directives (see Figure 2-25):

- IFS…: Launches the IFS dialog.
- ATT…: Launches the ATT dialog
- TSF…: Launches the TSF dialog
- DDCLO…: Launches the DDC LO dialog
- WAY…: Launches the WAY dialog
- FRO…: Launches the FRO dialog
- FRR…: Launches the FRR dialog
- FROV…: Launches the FROV dialog

(2) **Chan 1 – Chan 4**: Click on these menu items to bring up a submenus which contain channel related directives (see Figure 2-26):

- FGAIN…: Launches the FGAIN dialog
- REC…: Launches the REC dialog
- SFRO…: Launches the SFRO dialog
- SDPLR…: Launches the SDPLR dialog

(3) **Control**: Click on this menu item to bring up a submenu which contains these control directives (see Figure 2-27):

- SCRPT…: Launches the SCRPT dialog
- PRED…: Launches the PRED dialog
- CHAN…: Launches the CHAN dialog
- RUN: Issues the RUN directive
- HALT: Issues the HALT directive
- DISC: Issues the DISC directive

- QUIT: Issues the QUIT directive

## 2.4 Icons

The VSR displays can be minimized to conserve screen space. A minimized display appears as an icon with an icon name below it. The icon name is a shortened form of the text shown in the title bar.

## 2.5 Forms

There are no forms produced by the VSR.

## 2.6 Function Keys

When using the VSR as a remote client, the “F1” function functions as a toggle button, choosing between the tclient window being attached/unattached to the primary CNF display. The mouse cursor must be over the tclient window when using the F1 key to detach the tclient from the CNF display, but not when attaching it. On startup of a remote client, a CNF display is automatically started up with the tclient window attached to it.

## 2.7 Other Interactions

The VSR will not respond to voice commands or kicks.

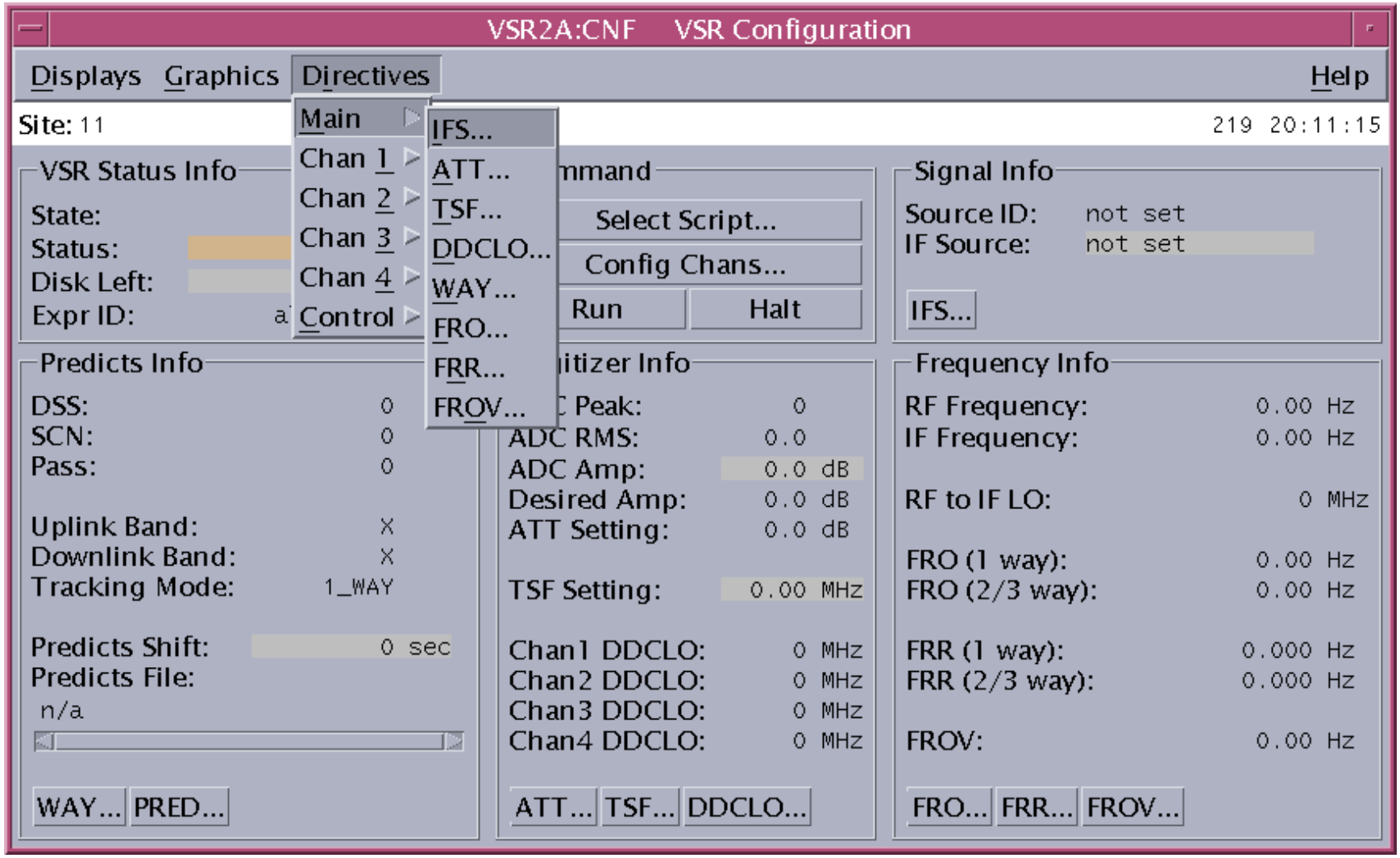


Figure 2-25 Directives Main Menu

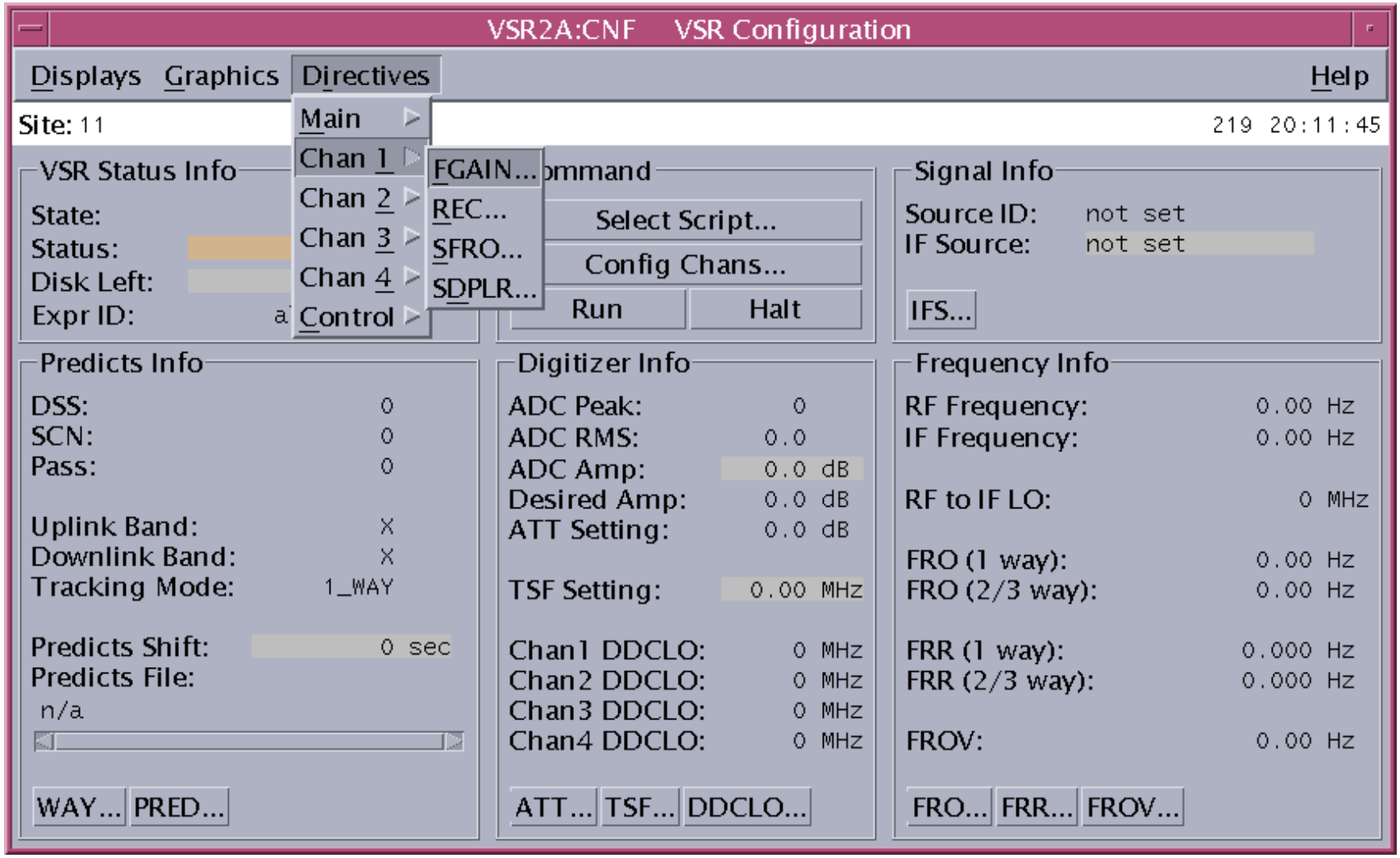


Figure 2-26 Directives Schan Menu

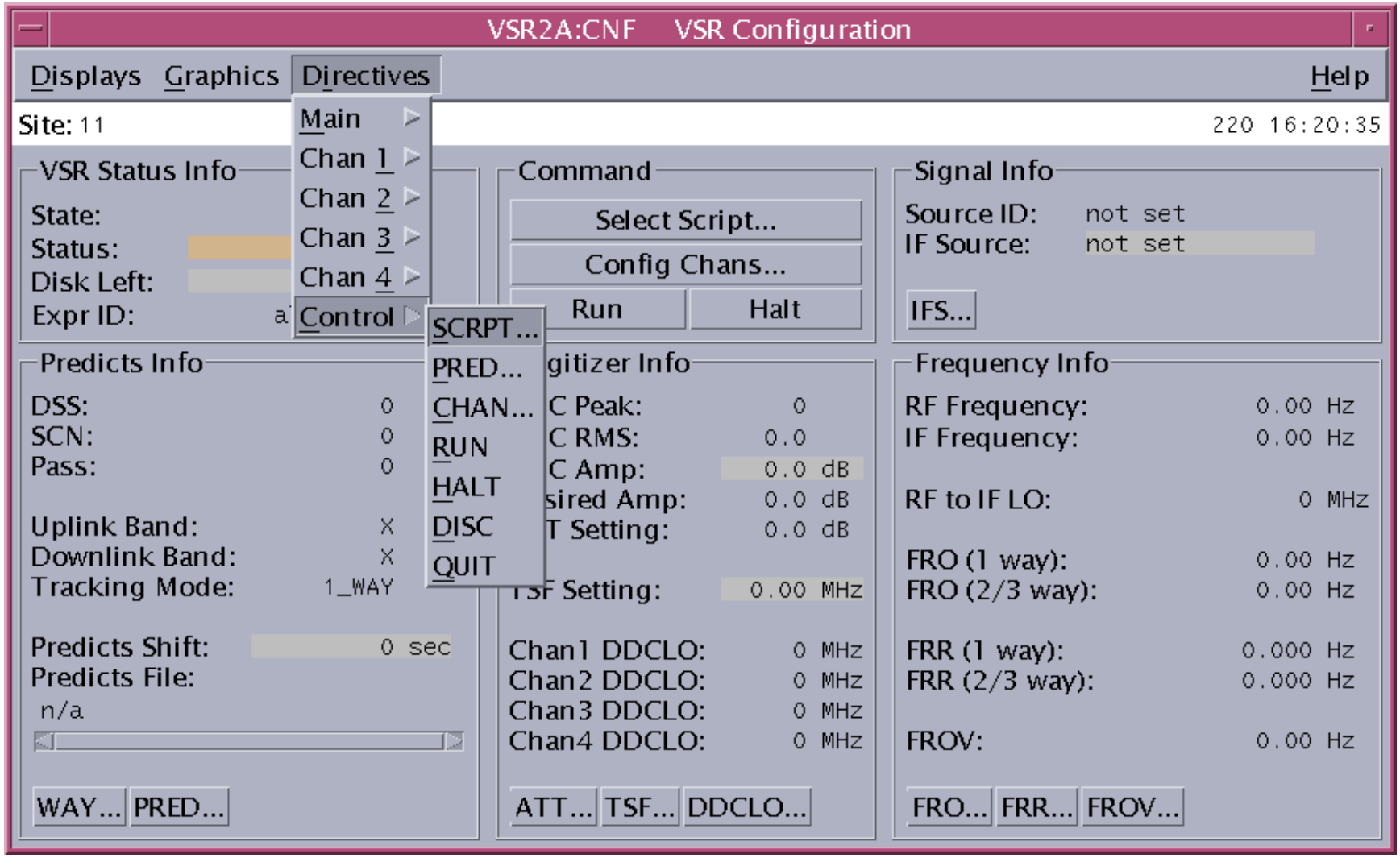


Figure 2-27 Directives Control Menu

### 2.7.1 Help Pulldown Menu

The Help pulldown menu in Figure 2-28, contains the following items:

(1) **About**: …… This is a default Help menu item. Every subsystem display has an About… item at the top of its Help menu. Click on this item to pop up the display's "About…" dialog box.

(2) **Help on Context**:….This is a default Help menu item. VSR displays do not support this item.

(3) **This Display**: ……..This is a default Help menu item. Click on this item to display a document that describes a display's purpose and use on Netscape. This item is supported on two VSR displays: CNF, STS.

(4) **Subsystem**: ……..This is a default Help menu item. Click on this item to display a document that contains a brief description of the subsystem on Netscape.

(5) **Displays**: ……...This is a default Help menu item. Click on this item to display a document on Netscape. This document summarizes the available displays. See Section 3 of Help/VSR SOM for more detail information regarding VSR's displays.

(6) **Monitor Data**: ……..This is a default Help menu item. Click on this item to display a document on Netscape. This document describes each monitor data item published by the VSR.

(7) **Directives**: ……This is a default Help menu item. Click on this item to display a document on Netscape. This document summarizes each directive understood by the VSR. See Section 2 of Help/VSR SOM for more detail information regarding VSR's directives.

(8) **VSR SOM**: ……..Click on this item to display VSR Software Operator's Manual (SOM) on Netscape. This menu item is supported on the VSR configuration and status displays (CNF, STS).

(9) **VSR LOGS**: Click on this item to display a directory of the VSR log files using Netscape.

(10) **VSR Predicts**: …Click on this item to display a directory of the VSR predict files using Netscape.

(11) **DLF Predicts**: …Click on this item to display a directory of the down-link frequency predicts using Netscape.

(12) **CFG Files**: …Click on this item to display a directory of the DOR configuration files using Netscape.

(13) **VSR Scripts**: …Click on this item to display a directory of the VSR scripts files using Netscape.

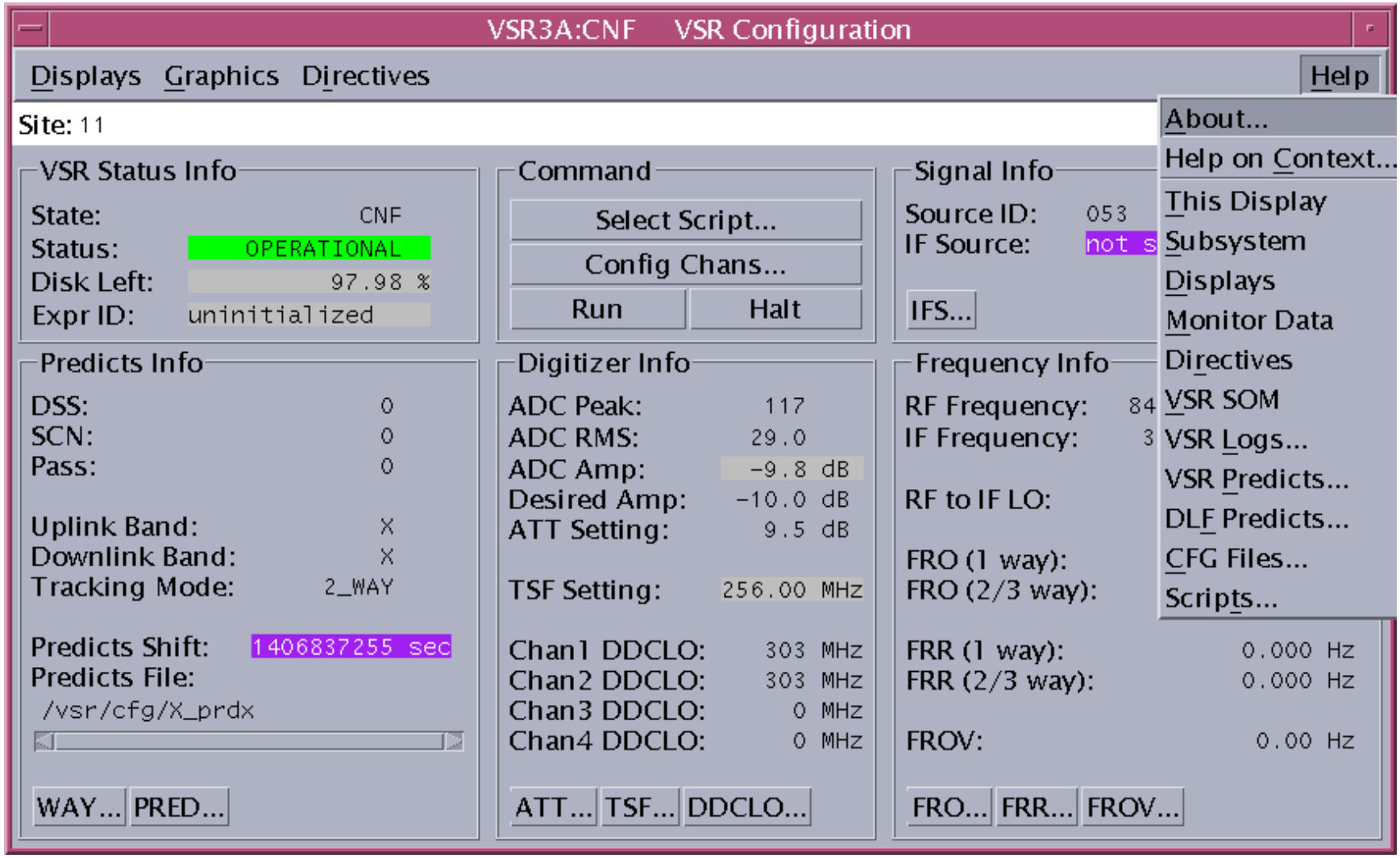


Figure 2-28 Help Menu

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# SECTION 3

# *MONITORING AND STATUS DISPLAYS*

## 3.1 Displays - Quick Reference

| DISPLAY MNEMONIC | DESCRIPTION | ASSOCIATED DISPLAYS | XREF |
|---|---|---|---|
| BLS | Displays detailed status for the BLS system | None | 2-33<br>3-10 |
| CHAN<#> | Displays detailed status for one of the 4 channels | None | 2-33<br>3-10 |
| CNF | Displays configuration, status and performance of the VSR | None | 3-14<br>3-15 |
| FFT<schan_id> | Displays spectrum plot for a given subchannel | None | 3-19<br>3-20 |
| FTH<N \| W> | Displays frequency time history plots for up to 8 narrowband subchannels, or a plot of 8 wideband subchannels | None | 3-22<br>3-23 |
| HIST<schan_id> | Displays histogram plot for a given subchannel | None | 3-25<br>3-26 |
| HISTADC | Displays the ADC amplitude histogram | None | 3-28<br>3-29 |
| PTH<N \| W> | Displays power time history plots for up to 8 narrowband channels, or a plot of 8 wideband subchannels | None | 3-31 |

| DISPLAY MNEMONIC | DESCRIPTION | ASSOCIATED DISPLAYS | XREF |
|---|---|---|---|
| STS | Displays overall status for the 4 channels | None | 3-34<br>3-35 |

### 3.2 Displays - Hierarchy

The VSR subsystem produces both numeric and graphic displays. These displays can be classified into five types:

(1) Displays of configuration, status, and performance

(2) Directive dialog and selection windows.

(3) Spectrum plots.

(4) Histogram plots.

(5) Time history charts.

All displays can be triggered from the CNF, STS and CHAN displays using the pull-down menus.

| | |
|---|---|
| BLS | BLS status display for all VSRs at a station |

| | |
|---|---|
| CNF | VSR's main config., and perf. display. |

| | |
|---|---|
| STS | VSR's main Chan status, and perf. display. |
| CHAN1 | VSR's detailed status for Chan 1 |
| CHAN2 | VSR's detailed status for Chan 2 |
| CHAN3 | VSR's detailed status for Chan 3 |

| | |
|---|---|
| CHAN4 | VSR’s detailed status for Chan 4 |

| | |
|---|---|
| GRAPHICS | VSR's plotting choices |

| | |
|---|---|
| FFT1N1 | Spectrum plot of Schan 1N1 which updates periodically |
| FFT1N2 | Spectrum plot of Schan 1N2 which updates periodically |
| FFT1W1 | Spectrum plot of Schan 1W1 which updates periodically |
| FFT1W2 | Spectrum plot of Schan 1W2 which updates periodically |
| FFT2N1 | Spectrum plot of Schan 2N1 which updates periodically |
| FFT2N2 | Spectrum plot of Schan 2N2 which updates periodically |
| FFT2W1 | Spectrum plot of Schan 2W1 which updates periodically |
| FFT2W2 | Spectrum plot of Schan 2W2 which updates periodically |
| FFT3N1 | Spectrum plot of Schan 3N1 which updates periodically |
| FFT3N2 | Spectrum plot of Schan 3N2 which updates periodically |
| FFT3W1 | Spectrum plot of Schan 3W1 which updates periodically |
| FFT3W2 | Spectrum plot of Schan 3W2 which updates periodically |
| FFT4N1 | Spectrum plot of Schan 4N1 which updates periodically |
| FFT4N2 | Spectrum plot of Schan 4N2 which updates periodically |
| FFT4W1 | Spectrum plot of Schan 4W1 which updates periodically |

| | |
|---|---|
| FFT4W2 | Spectrum plot of Schan 4W2 which updates periodically |
| HIST1N1 | Histogram plot of suchan 1N1 which updated periodically |
| HIST1N2 | Histogram plot of suchan 1N2 which updated periodically |
| HIST1W1 | Histogram plot of suchan 1W1 which updated periodically |
| HIST1W2 | Histogram plot of suchan 1W2 which updated periodically |
| HIST2N1 | Histogram plot of suchan 2N1 which updated periodically |
| HIST2N2 | Histogram plot of suchan 2N2 which updated periodically |
| HIST2W1 | Histogram plot of suchan 2W1 which updated periodically |
| HIST2W2 | Histogram plot of suchan 2W2 which updated periodically |
| HIST3N1 | Histogram plot of suchan 3N1 which updated periodically |
| HIST3N2 | Histogram plot of suchan 3N2 which updated periodically |
| HIST3W1 | Histogram plot of suchan 3W1 which updated periodically |
| HIST3W2 | Histogram plot of suchan 3W2 which updated periodically |
| HIST4N1 | Histogram plot of suchan 4N1 which updated periodically |
| HIST4N2 | Histogram plot of suchan 4N2 which updated periodically |
| HIST4W1 | Histogram plot of suchan 4W1 which updated periodically |
| HIST4W2 | Histogram plot of suchan 4W2 which updated periodically |
| HISTADC | Histogram plot of the ADC Amplitude |

| | |
|---|---|
| FTHN | Measured frequency residual time history display of narrowband Subchannels |
| FTHW | Measured frequency residual time history display of wideband Subchannels |
| PTHN | Measured Pc/No time history display of narrowband Subchannels |
| PTHW | Measured Pc/No time history display of wideband Subchannels |

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## 3.1 Displays - Detailed Description

Text Displays - Quick Reference

| BLS | BLS Status Display |
|---|---|

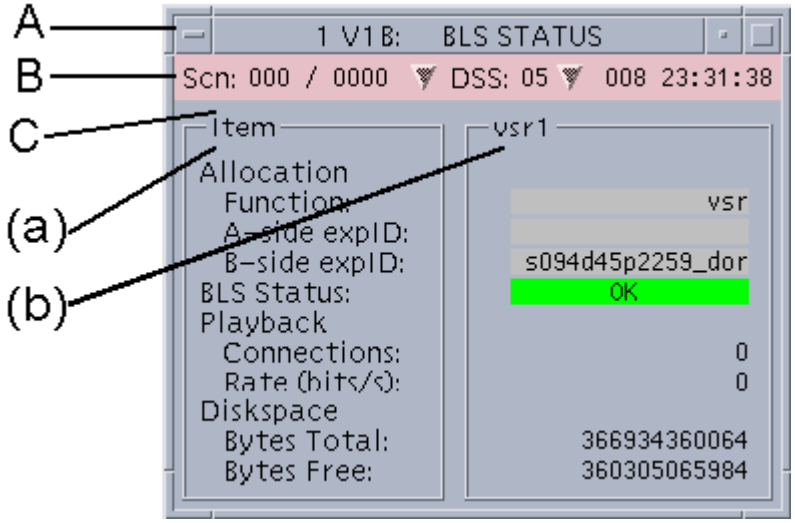


Figure 3-1 BLS Display

Display Displays - Quick Reference

| | | | |
|---|---|---|---|
| **BLS** | BLS Status Display | | |
| | | | |
| DESCRIPTION | This display provides detailed status relating to the BLS data storage system. It displays allocation, playback connection status and disk free information for all VSRs at a station | | |
| LIMITATIONS | The connection bar shows connection colors and pull downs only when using this display in an NMC connection | | |
| DATA | This display contains the following elements which are keyed to the previous figure | | |
| | A | | |
| | | **Title Bar**<br>• Display's mnemonic ID<br>• Title | |
| | B | | |
| | | **Connection Bar**<br>• The "Scn" pull-down menu contains a list of the spacecraft number and pass number from the NMC workstation.<br>• The "DSS" pull-down menu contains a list of antennas from the NMC workstation.<br>A time tag on the right end indicates the DOY and time of last received data. | |
| | C | | |
| | | **Work Area**<br>The work area contains two groups: (a) Items, (b) VSR info | |
| | | (a) | The Items group contains the names of the item to be displayed. There are 4 subitems in this group: Allocation, BLS status, Playback and Diskspace |

| **BLS** | BLS Status Display | | |
|---|---|---|---|
| | | | |
| | | | • **Allocation** –Items which refer to the VSR's availability and state<br>• **BLS status** – Shows the state of the BLS daemon<br>• **Playback** – Indicates the current number of playback connections and the playback data rate<br>• **Diskspace** – Shows the total and free bytes on the BLS array |
| | | (b) | The VSR info group(s) contain(s) the fields displaying the items described in (a) for a given VSR at a station. |

Text Displays - Quick Reference

| CHAN | VSR Channel Status Display |
|---|---|

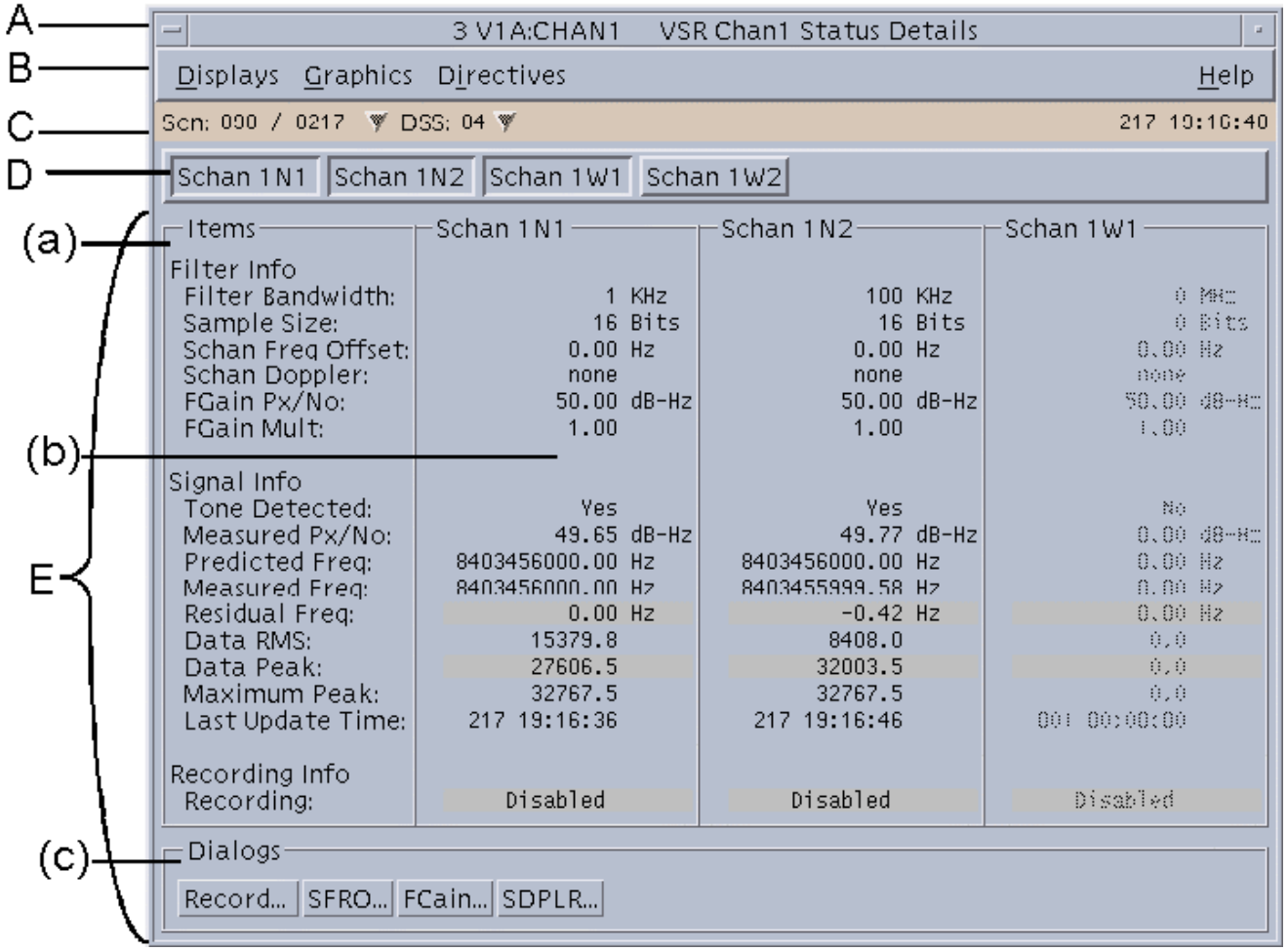


Figure 3-2 CHAN Display

| | | |
|---|---|---|
| **CHAN** | VSR Channel Status Display | |
| | | |
| DESCRIPTION | This display provides detailed status and configuration relating to specific VSR channels | |
| LIMITATIONS | The connection bar shows connection colors and pull downs only when using this display in an NMC connection | |
| DATA | This display contains the following elements which are keyed to the previous figure | |
| | A | |
| | | **Title Bar**<br>• Display's mnemonic ID<br>• Title |
| | B | |
| | | **Menu Bar**<br>• The "Displays" pull-down menu contains the standard display types, including an alphabetized list<br>• The "Graphics" pull down menu contains all the VSR plot displays.lots<br>• The "Directives" pull-down menu contains all the client directives<br>• The "Help" pull-down menu contains the pdf-formatted SOM |
| | C | |
| | | **Connection Bar**<br>• The "Scn" pull-down menu contains a list of the spacecraft number and pass number from the NMC workstation.<br>• The "DSS" pull-down menu contains a list of antennas from the NMC workstation.<br>• A time tag on the right end indicates the DOY and time of last received data. |
| | D | |

| | | | |
|---|---|---|---|
| **CHAN** | VSR Channel Status Display | | |
| | | | |
| | | **Tool Bar**<br>The Tool Bar Contain 4 buttons, each representing one of the 4 channels. These buttons Hide/Show the corresponding channel info on the CHAN display. | |
| | E | | |
| | | **Work Area**<br>The work area contains three groups: (a) Items, (b) Channels, and (c) Dialogs | |
| | | (a) | **Items Group**<br>Contains Labels for the Schan Groups to the right<br>• **Filter Info SubGroup**<br>o Sample Size: Displays the number of bits used in the filter<br>o Filter Bandwidth: Displays the bandwidth of the filter<br>o Schan Freq Offset: displays the filter's frequency offset<br>o Schan Doppler: displays the type of Doppler correction applied<br>o FGain Px/No: Displays the signal power of the carrier<br>• **Signal Info SubGroup**<br>o Signal Detected: Indicates "Yes" or "No" for carrier detection<br>o Measured Px/No: Displays the signal power of the carrier<br>o Predicted Freq: Displays the current predicted frequency<br>o Measured Freq: Displays the current measured frequency<br>o Residual Freq: Displays the residual frequency offset<br>o Data RMS: Displays the RMS data value<br>o Data Peak: Displays the data peak |

| **CHAN** | VSR Channel Status Display | | |
|---|---|---|---|
| | | | |
| | | | o Maximum Peak: Displays the current max peak of the data<br>o Last Update Time: Indicates when the VSR last sent Schan data<br>• **Recording Info SubGroup**<br>o Recording: Indicates with a "Enabled" or "Disabled", whether the subchannel is being recorded. "Enabled" is accompanied by status color OPERATIONAL (green). |
| | | (b) | **Channels <1-4> Group(s)**<br>Contain(s) fields that correspond to the field labels in the Items group to the left. |

| CNF | VSR configuration display |
|---|---|

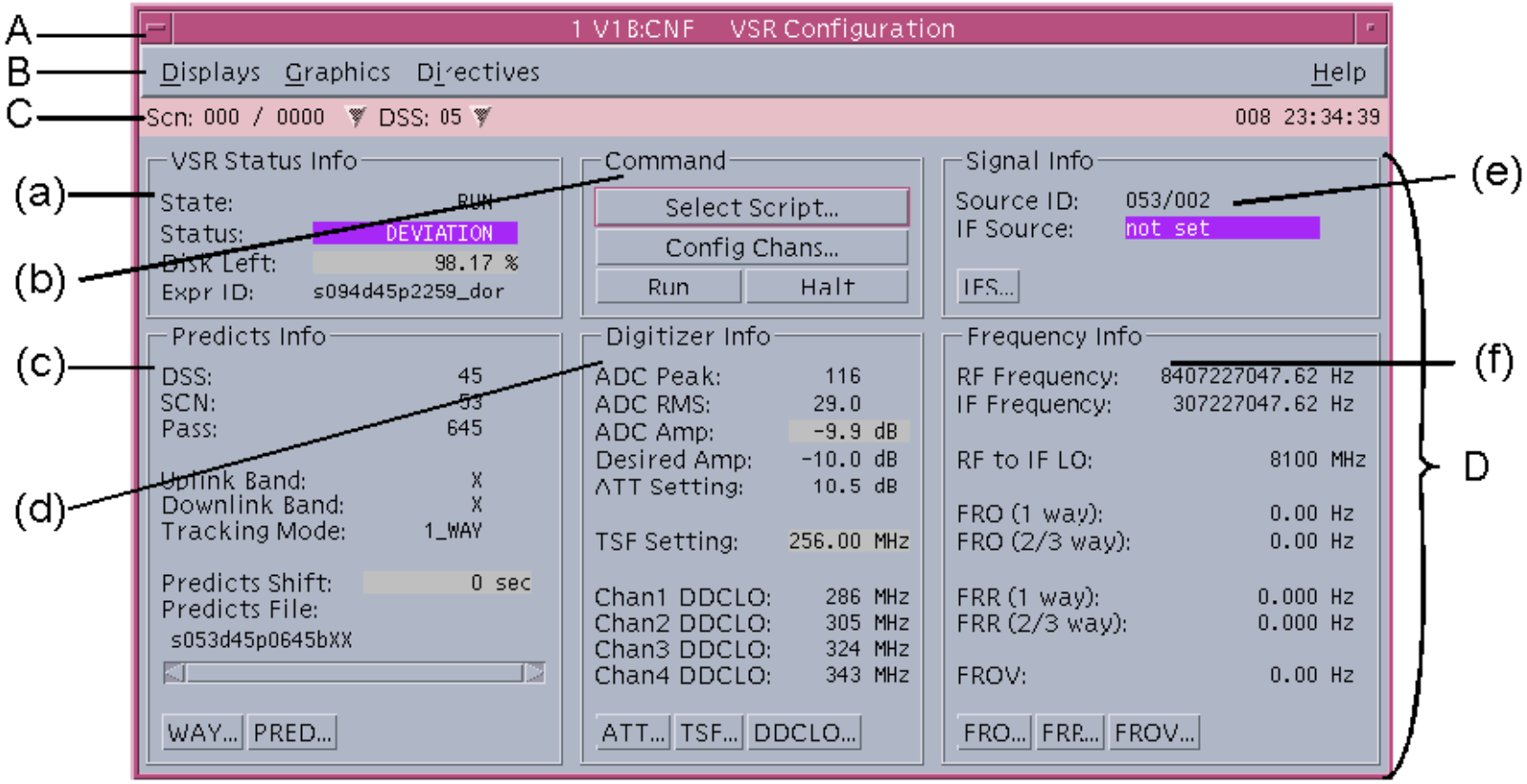


Figure 3-3 CNF Display

| | | |
|---|---|---|
| **CNF** | VSR configuration display | |
| | | |
| DESCRIPTION | This display provides top-level configuration and commands for running the VSR. | |
| NOTES | If used as a remote client, the text client (tclient) will automatically attach to the buttom of the CNF display. The tclient can be attached or removed by pressing the "F1" Key in the activated window. A –1.00% displayed with a yellow warning color in the Disk Left field means the BLS system has crashed and the VSR needs rebooting. | |
| LIMITATIONS | The connection bar shows connection colors and pull downs only when using this display in an NMC connection | |
| DATA | This display contains the following elements which are keyed to the previous figure | |
| | A | **Title Bar**<br>• Display's mnemonic ID<br>• Title |
| | B | **Menu Bar**<br>• The "Displays" pull-down menu contains the standard display types, including an alphabetized list<br>• The "Graphics" pull down menu contains all the VSR plot displays.<br>• The "Directives" pull-down menu contains VSR channel, Subchannel and control directives.<br>• The "Help" pull-down menu contains the pdf-formatted Software Operator's Manual (SOM). |

| | | | |
|---|---|---|---|
| **CNF** | VSR configuration display | | |
| | | | |
| | C | **Connection Bar**<br>• The "Scn" pull-down menu contains a list of the spacecraft number and pass number from the NMC.<br>• The "DSS" pull-down menu contains a list of antennas from the NMC.<br>• A time tag on the right end indicates the DOY and time of last received data. | |
| | D | **Work Area**<br>The work area contains six groups: (a) VSR Status Info, (b) Command, (c) Predicts, (d) Digitizer Info, (e) Signal Info, and (f) Frequency Info. | |
| | | (a) | **VSR Status Info Group**<br>• State: Indicates whether the VSR is in the CNF or RUN state<br>• Status: Indicates the status level of the VSR. Will retain color for one minute after each warning or Critical event notice, even if disabled with EVT.<br>• Disk Left: Shows the percentage of disk space available for recording on both A and B VSRs. This field will display a warning (yellow) color if 5% or less diskspace is left. A yellow warning color and –1.00% will be displayed if the underlying BLS database daemon has failed. In this case, the VSR needs rebooting.<br>• Expr ID: Displays the experiment name |
| | | (b) | **Command Group**<br>• Select Script… (button): Launches the SCRPT dialog<br>• Config Chans… (button): Launches the CHAN dialog<br>• RUN (button): Sends the RUN directive<br>• HALT (button): Sends the HALT directive |
| | | (c) | **Predicts Info Group** |

| CNF | VSR configuration display | | |
|---|---|---|---|
| | | | |
| | | | • DSS: Indicates the Deep Space Station of the predicts<br>• SCN: Indicates the Space Craft Number of the predicts<br>• PASS: Indicates the pass number of the predicts<br>• Uplink Band: Indicates either a S, X or Ka uplink band<br>• Downlink Band: Indicates either a S, X or Ka downlink band<br>• Tracking Mode: Indicates either a 1-Way, 2-Way or 3-Way tracking mode<br>• Predicts Shift: Indicates how far the predict timetags are to be shifted<br>• Predicts File: Shows the predicts filename. Has an overflow scroll bar for long filenames.<br>• PRED… (button): Launches the PRED dialog<br>• WAY… (button): Launches the Tracking Mode dialog |
| | | (d) | **Digitizer Info Group**<br>• ADC Peak: Displays the current ADC peak value<br>• ADC RMS: Displays the current ADC RMS value<br>• ADC Amp: Displays the current ADC Amplitude<br>• Desired Amp: Shows the Desired Amplitude for the ADC<br>• ATT Setting: Displays the current Attenuator setting<br>• TSF Setting: Displays the current Test Synthesizer Frequency in MHz<br>• Chan<#> DDCLO: Displays the current DDCLO setting for the channels<br>• ATT… (button): Launches the ATT dialog<br>• TSF… (button): Launches the TSF dialog<br>• DDCLO… (button): Launches the DDCLO dialog |

| CNF | VSR configuration display | | |
|---|---|---|---|
| | | | |
| | | (e) | **Signal Info Group**<br>• Source ID: Indicates the source currently being tracked. During a DOR pass, the current scan number will be appended to the Source ID after a '/'.<br>• IF Source: Displays the currently selected IF source |
| | | (f) | **Frequency Info Group**<br>• RF Frequency: Displays the current predicted RF frequency<br>• RF to IF LO: Displays the RF to IF LO<br>• DDC LO: Displays the Digital Down Converter Local Oscillator Frequency<br>• FRO (1-Way): Displays the 1-way frequency offset<br>• FRO (2/3-Way): Displays the 2 or 3-way frequency offset<br>• FRR (1-Way): Displays the 1-way frequency offset rate<br>• FRR (2/3-Way): Displays the 2 or 3-way frequency offset rate<br>• FROV: Displays the frequency override<br>• FRO (button): Launches the FRO dialog<br>• FRR (button): Launches the FRR dialog<br>• FROV (button): Launches the FROV dialog |

| FFT Plot | Subchannel frequency spectrum plot |
|---|---|

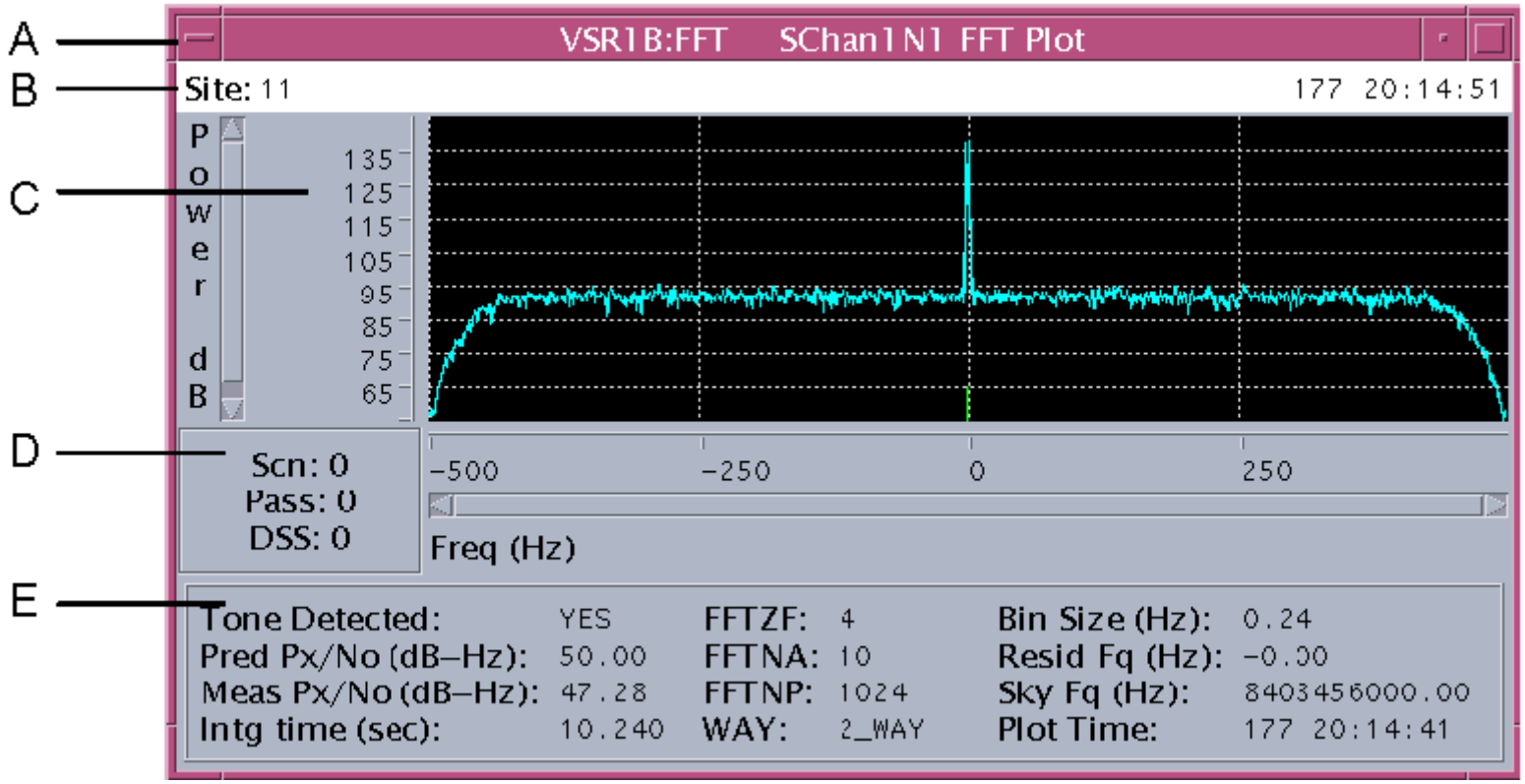


Figure 3-4 FFT2 Plot

| **FFT Plot** | Subchannel Frequency Spectrum Plot | |
|---|---|---|
| | | |
| DESCRIPTION | This display provides a spectrum plot for a subchannel. | |
| NOTES | When the VSR is halted, the plot will display any residual data with gray color. | |
| LIMITATIONS | The connection bar shows connection colors and pull downs only when using this display in an NMC connection | |
| DATA | This display contains the following elements which are keyed to the previous figure | |
| | A | Title Bar<br>• Display's mnemonic ID without the Subchannel number<br>• Title |
| | B | Connection Bar<br>• The "Scn" pull-down menu contains a list of the spacecraft number and pass number from the NMC.<br>• The "DSS" pull-down menu contains a list of antennas from the NMC.<br>• A time tag on the right end indicates the DOY and time of last received data. |
| | C | Plot Area<br>Contains the plot, supporting scroll bars and labels. Plot color is CYAN in the RUN state when not recording, GREEN in the RUN state while recording, and GREY after being halted and in the CNF state |
| | D | Plot Info Area<br>• Scn: Displays the predicts spacecraft number<br>• Pass: Displays the predicts pass number<br>• DSS: displays the predicts Deep Space Station number |

| **FFT Plot** | Subchannel Frequency Spectrum Plot | |
|---|---|---|
| | | |
| | E | Status Area<br>• Tone Detected: Indicates "Yes" or "No" for detection<br>• Pred Px/No: Displays the predicted signal to noise ratio, same as Fgain Px/No<br>• Meas Px/No: Displays the measured signal to noise ratio<br>• Intg Time: Time span of the data collection<br>• FFTZF: Setting for zero fill<br>• FFTNA: Setting for number of averages<br>• FFTNP: Setting for number of points in each average<br>• WAY: Indicates the current tracking mode: 1-Way, 2-Way or 3-Way<br>• Bin Size: Indicates the FFT frequency bin size<br>• Resid Fq: Displays the residual frequency from predicted<br>• Sky Fq: Displays the current RF measured sky frequency<br>• Plot Time: Indicates when the VSR started the collection of the plot data |

| FTH<N \| W> | Frequency Residual Time History Displays |
|---|---|

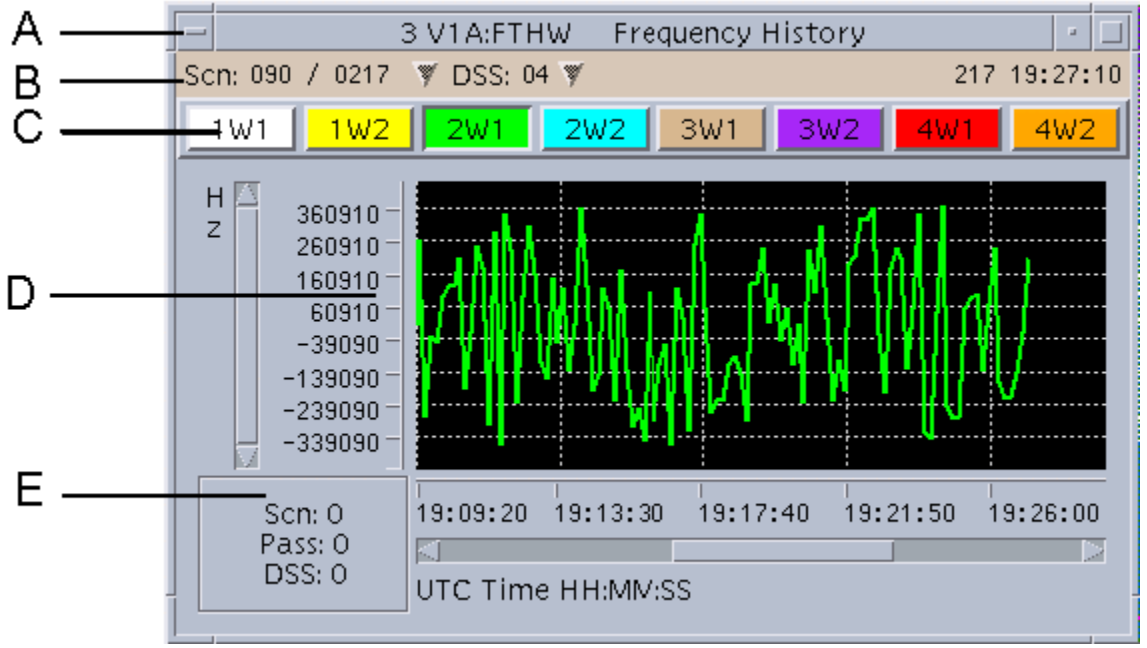


Figure 3-5 FTHW Display

| **FTH<N \| W>** | Frequency Residual Time History Displays | |
|---|---|---|
| | | |
| DESCRIPTION | This display provides Frequency Time History plots for all used narrow band or all used wideband subchannels. | |
| NOTES | Plot defualts can be changed by right-clicking on the plot and selecting the 'Control' option. A connecting line will be drawn between gaps in the plots (wide band or narrow band) caused by a pass using scans that alternate between narrow and wideband subchannels. This line should be ignored and not considered valid data. | |
| LIMITATIONS | By default, only 20 minutes of data will be visible on the plot.<br>The connection bar shows connection colors and pull downs only when using this display in an NMC connection | |
| DATA | This display contains the following elements which are keyed to the previous figure | |
| | A | **Title Bar**<br>• Display's mnemonic ID<br>• Title |
| | B | **Connection Bar**<br>• The "Scn" pull-down menu contains a list of the spacecraft number and pass number from the NMC.<br>• The "DSS" pull-down menu contains a list of antennas from the NMC.<br>• A time tag on the right end indicates the DOY and time of last received data. |
| | C | **Tool Bar**<br>This contains 8 color-coded buttons labeled with their respective narrow-band or wide-band subchannels. Button and data colors DO NOT REFLECT STATUS, only link buttons to color-coded plot data. |

| FTH<N \| W> | Frequency Residual Time History Displays | |
|---|---|---|
| | | |
| | D | **Plot Area**<br>Contains the Plots. They are color-coded to match the tool bar buttons. |
| | E | **Plot Info**<br>• Scn: Displays the predicts space craft number<br>• Pass: Displays the predicts pass number<br>• DSS: Displays the predicts Deep Space Station number |

| HIST | Sample Data Histogram |
|---|---|

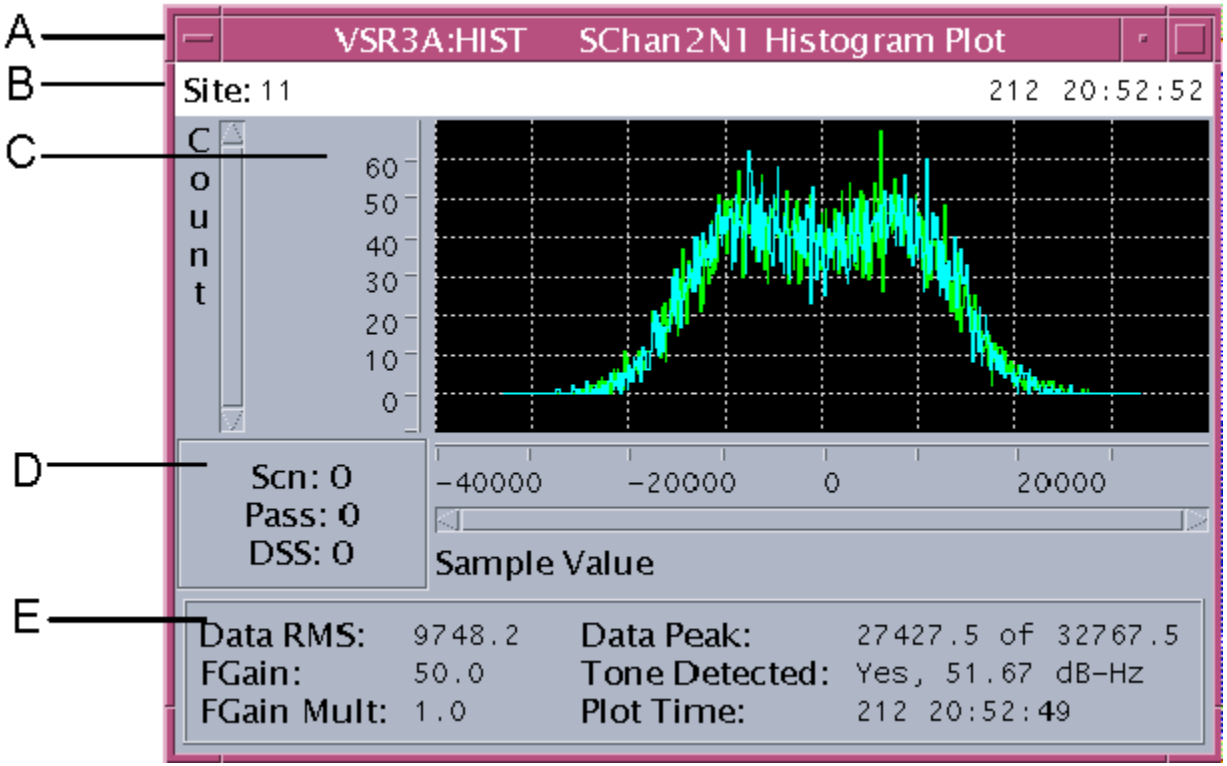


Figure 3- HIST Display

| **HIST** | Sample Data Histogram | |
|---|---|---|
| | | |
| DESCRIPTION | This display provides a plot of the data histogram for a given Subchannel. This plot provides a measure of how efficiently data is being represented by discreet digital levels. | |
| NOTES | When the VSR is halted, the plot will display any residual data with gray color. | |
| LIMITATIONS | The connection bar shows connection colors and pull downs only when using this display in an NMC connection | |
| DATA | This display contains the following elements which are keyed to the previous figure | |
| | A | **Title Bar**<br>• Display's mnemonic ID without the Subchannel number<br>• Title |
| | B | **Connection Bar**<br>• The "Scn" pull-down menu contains a list of the spacecraft number and pass number from the NMC.<br>• The "DSS" pull-down menu contains a list of antennas from the NMC workstation.<br>• A time tag on the right end indicates the DOY and time of last received data. |
| | C | **Plot Area**<br>Contains the plot, supporting scroll bars and labels. Plot colors are GREEN and CYAN for the I and Q channels respectively when in the RUN state. After being halted and in the CNF state, both the I and Q plots will be GREY. |
| | D | **Plot Info Area**<br>• Scn: Indicates predicts Space craft number<br>• Pass: Indicates predicts Pass number<br>• DSS: Indicates predicts Deep Space Station number |

| **HIST** | Sample Data Histogram | |
|---|---|---|
| | | |
| | E | **Status Area**<br>• Data RMS: Displays the RMS value of the current plot data<br>• FGain: Indictes the desired Px/No setting that was set using the FGAIN directive<br>• FGain Mult: Indicates the fgain multiplier that was set using the FGAIN directive<br>• ADC AMP: Indicates the amplitude of the data relative to an amplitude that would saturate the ADC<br>• Data Peak: Indicates the peak digital level being used to represent the data, out of the total levels available for the current plot<br>• Plot Time: Indicates the time that the VSR started to collect the plot data |

| HISTADC | ADC Histogram |
|---|---|

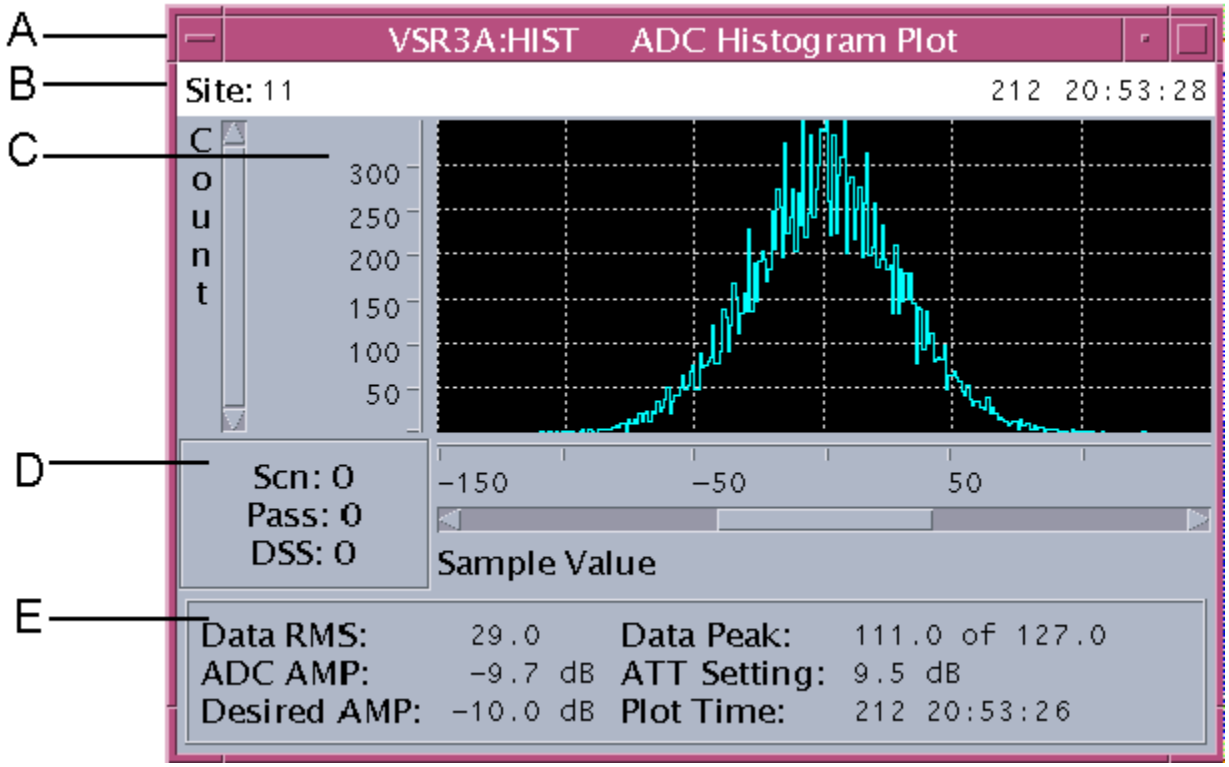


Figure 3-6 HISTADC Display

| | | |
|---|---|---|
| **HISTADC** | ADC Histogram | |
| | | |
| DESCRIPTION | This display provides a plot of the Analog to Digital Converter (ADC) Histogram. This plot provides a measure of how efficiently data is being represented by discreet digital levels across the 110 MHz input band. | |
| NOTES | Plot defualts can be changed by right-clicking on the plot and selecting the options. | |
| LIMITATIONS | The connection bar shows connection colors and pull downs only when using this display in an NMC connection | |
| DATA | This display contains the following elements which are keyed to the previous figure | |
| | A | **Title Bar**<br>• Display's mnemonic ID<br>• Title |
| | B | **Connection Bar**<br>• The "Scn" pull-down menu contains a list of the spacecraft number and pass number from the NMC if in a connection, otherwise the site number will be displayed.<br>• The "DSS" pull-down menu contains a list of antennas from the NMC if in a connection.<br>• A time tag on the right end indicates the DOY and time of last received data. |
| | C | **Plot Area**<br>Contains the plot, supporting scroll bars and labels |
| | D | **Plot Info Area**<br>• Scn: Indicates predicts Space craft number<br>• Pass: Indicates predicts Pass number<br>• DSS: Indicates predicts Deep Space Station number |

| **HISTADC** | ADC Histogram | |
|---|---|---|
| | | |
| | E | **Status Area**<br>• Data RMS: Displays the RMS value of the current plot data<br>• ADC AMP: Indicates the amplitude of the data relative to an amplitude that would saturate the ADC<br>• Desired AMP: Indicates the desired attenuator amplitude that was specified using the ATT directive<br>• Data Peak: Indicates the peak digital level being used to represent the data, out of the total levels available for the current plot<br>• ATT Setting: Indicates the desired attenuator setting that was specified using the ATT directive<br>• Plot Time: Indicates the time that the VSR sent the plot data |

| PTH<N \| W> | Power Time History Displays |
|---|---|

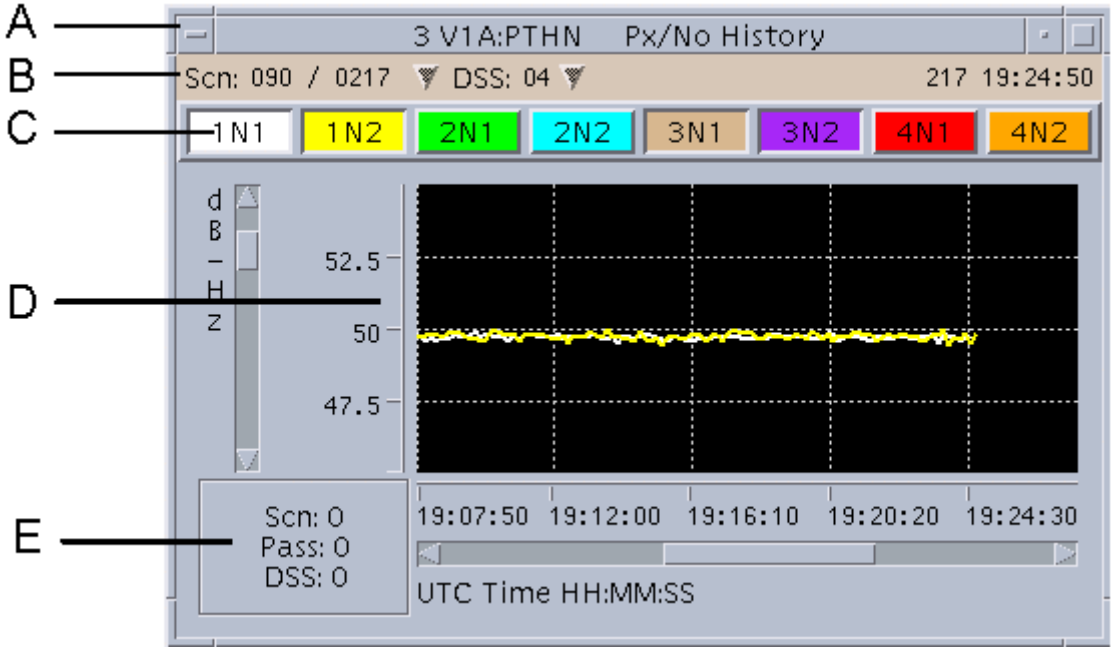


Figure 3-7 PTHN Display

| | | |
|---|---|---|
| **PTH<N \| W>** | Signal Power to Noise Ratio Time History Displays | |
| | | |
| DESCRIPTION | This display provides signal power to noise ratio time history (Px/No) plots for all used narrow-band or all used wide-band subchannels. | |
| NOTES | Plot defualts can be changed by right-clicking on the plot and selecting the 'Control' option. A connecting line will be drawn between gaps in the plots (wide band or narrow band) caused by a pass using scans that alternate between narrow and wideband subchannels. This line should be ignored and not considered valid data. | |
| LIMITATIONS | By default, only 20 minutes of data will be visible on the plot.<br>The connection bar shows connection colors and pull downs only when using this display in an NMC connection | |
| DATA | This display contains the following elements which are keyed to the previous figure | |
| | A | Title Bar<br>• Display's mnemonic ID<br>• Title |
| | B | Connection Bar<br>• The "Scn" pull-down menu contains a list of the spacecraft number and pass number from the NMC.<br>• The "DSS" pull-down menu contains a list of antennas from the NMC.<br>• A time tag on the right end indicates the DOY and time of last received data. |
| | C | Tool Bar<br>This contains 8 color-coded buttons labeled with their respective subchannel, either all wide-band or all narrow-band. Button and data colors DO NOT REFLECT STATUS, they only link the buttons to color-coded plot data. |

| **PTH<N \| W>** | Signal Power to Noise Ratio Time History Displays | |
|---|---|---|
| | | |
| | D | Plot Area<br>Contains the Plots. They are color-coded to match the tool bar buttons. |
| | E | Plot Info<br>• Scn: Displays the predicts space craft number<br>• Pass: Displays the predicts pass number<br>• DSS: Displays the predicts Deep Space Station number |

| STS | Main VSR Status Display |
|---|---|

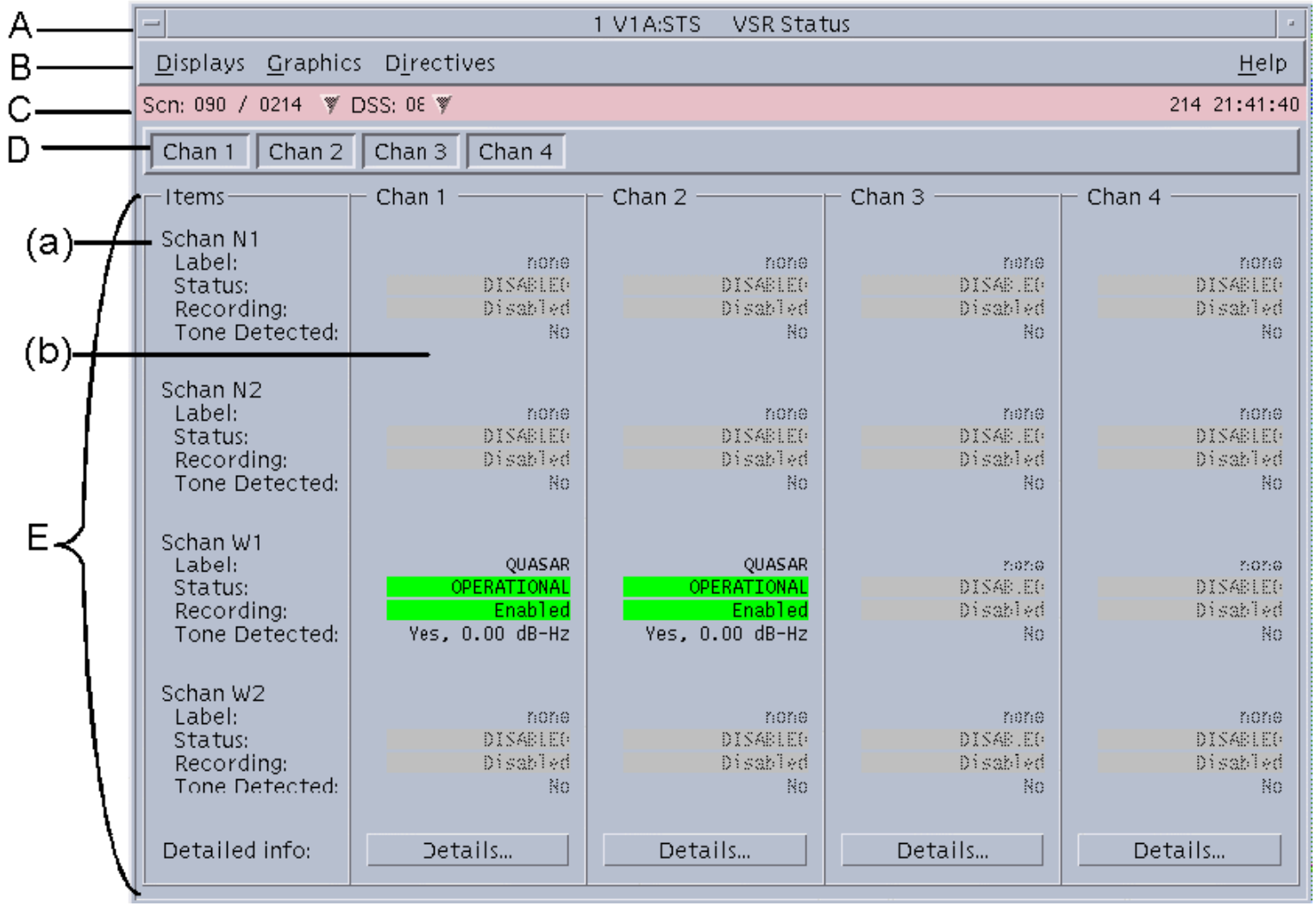


Figure 3-8 STS Display

| | | |
|---|---|---|
| **STS** | VSR Schan Status Display | |
| | | |
| DESCRIPTION | This display provides detailed status and configuration for the VSR | |
| NOTES | | |
| LIMITATIONS | The connection bar shows connection colors and pull downs only when using this display in an NMC connection | |
| DATA | This display contains the following elements which are keyed to the previous figure | |
| | A | **Title Bar**<br>• Display's mnemonic ID<br>• Title |
| | B | **Menu Bar**<br>• The "Displays" pull-down menu contains the standard display types, including an alphabetized list<br>• The "Graphics" pull down menu contains all the VSR plot displays.lots<br>• The "Directives" pull-down menu contains all the client directives<br>• The "Help" pull-down menu contains the pdf-formatted SOM |
| | C | **Connection Bar**<br>• The "Scn" pull-down menu contains a list of the spacecraft number and pass number from the NMC workstation.<br>• The "DSS" pull-down menu contains a list of antennas from the NMC workstation.<br>• A time tag on the right end indicates the DOY and time of last received data. |
| | D | **Tool Bar**<br>The Tool Bar Contain 4 buttons each representing one of the 4 channels. These buttons hide/show the corresponding channel info on the STS display. |

| **STS** | VSR Schan Status Display | | |
|---|---|---|---|
| | E | **Work Area**<br>The work area contains 2 groups, (a) Items and (b) Channels | |
| | | (a) | **Items Group**<br>Contains Labels for four subchannels in each of the channel groups to the right:<br>o Schan<schan_id>: Specifies the subchannel<br>o Label: Specifies the current label given to the subchannel<br>o Status: Specifies the status color and message of the subchannel<br>o Recording: Indicates the recording status – "Enabled" or "Disabled", and color<br>o Tone Detected: Indicates with "no" or "yes and the Px/No value when a tone is detected<br>Detailed Info: Buttons that open channel status displays |
| | | (b) | **Channel Group**<br>Contains information labeled in the Items Group<br>Details… (button): Launches the channel status display – CHAN<#> |

| | |
|---|---|
| **TCLIENT** | Text client for gconnect interface |

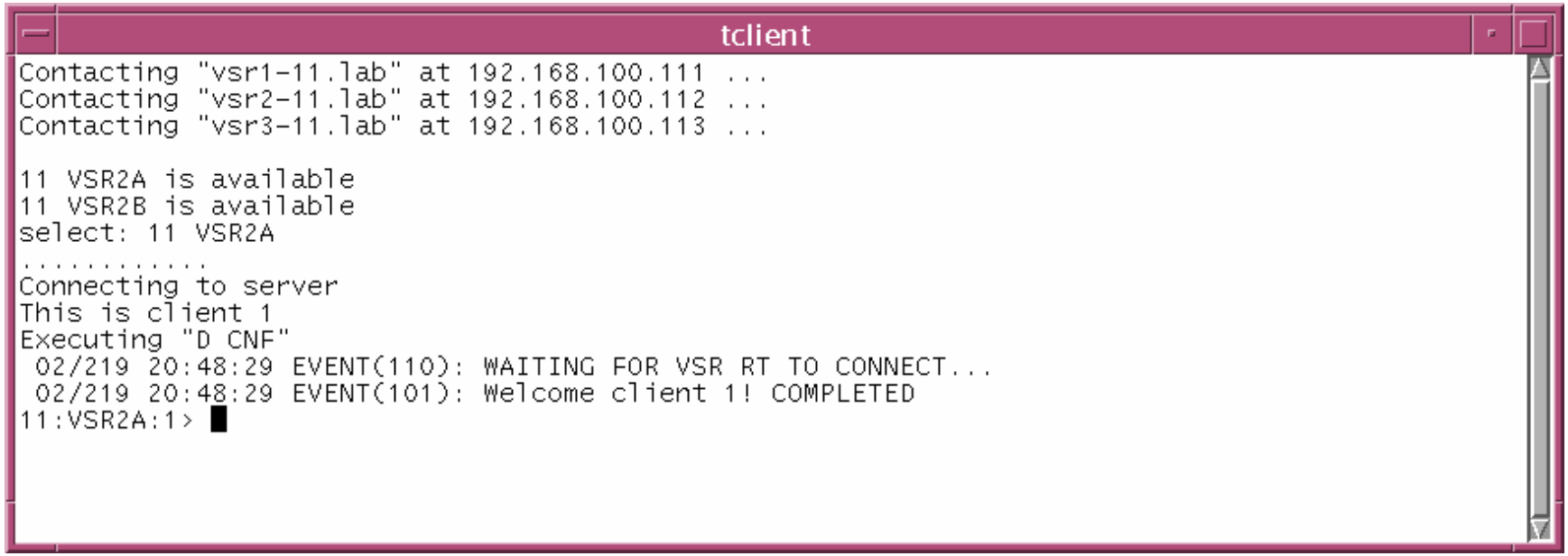


Figure 3-9 Text Client or tclient

| TCLIENT | Text client for gconnect interface |
|---|---|

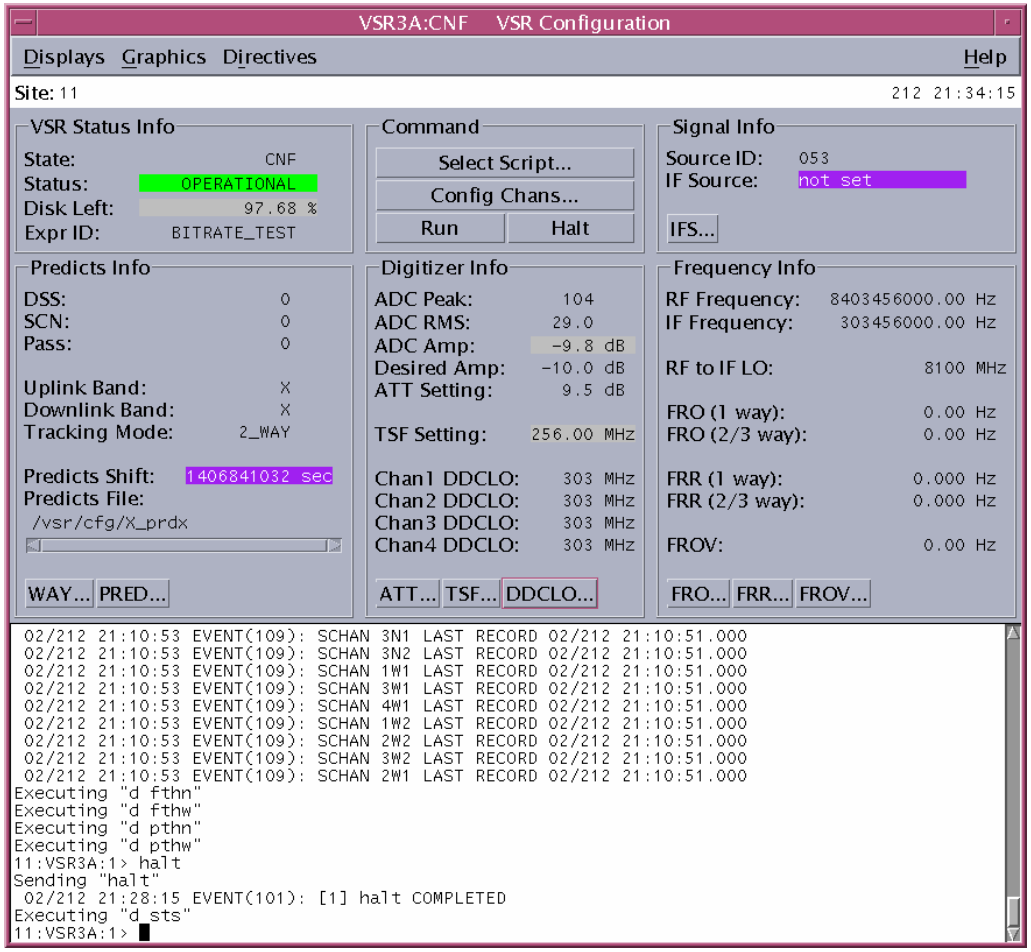


Figure 3-10 tclient attached to CNF display for gconnect interface

| **TCLIENT** | Text client for gconnect interface |
|---|---|
| | |
| DESCRIPTION | The Text Client (tclient) is the command line interface for the VSR in the stand-alone mode. All directives and displays can be entered on the command line of the tclient. The tclient also provides event notices from the VSR. |
| NOTES | When running as a remote gui gconnext client, the tclient window will attach itself to the bottom of the CNF display upon startup of the VSR client with the same vertical size and resizing to the CNF display horizontally. The tclient can be detached or reattached by using the "F1" key as a toggle (See figure 3.9). When running tconnect, the command line is in the original window. |
| LIMITATIONS | The tclient cannot be resized when attached to the CNF display in the active window. |
| DATA | None |

# SECTION 4

# *MESSAGES*

## 4.1 Event Notices

Event notices within the VSR are all contained within the header file en_table.h. They fall into several categories, including PROGRESS, WARNING, CRITICAL and DEVIATION. All of these show up in the VSR Log file and color-coded in the command window of the VSR client but without leading category. The text only client (tconnect) does not have color, so operators using this must know the event status by number ranges. Caution: event notices may appear up to 40 seconds after the error they point to is corrected

**1 CRITICAL, "RT/DP BUFFER SIZES DIFFER: | VS. |"**

**2 CRITICAL, "INVALID DBL_TIME | TIMES"**

**3 CRITICAL, "RT INTERNAL ERROR IN FILE | AT LINE |"**

**4 CRITICAL, "DP INTERNAL ERROR IN FILE | AT LINE |"**

**5 CRITICAL, "START ERROR |"**

Cause: A critical error has occurred.

Description: These errors should not happen, if they do it indicates that the VSR software has been corrupted or the VSR hardware has become unstable.

Action: Restart the VSR which issued the event notice. It may be necessary to restart both channels of the VSR. If problems persist a spare VSR should be used to complete the pass. In either case maintenance personnel should be notified of the problem.

**6 CRITICAL, "IFS ERROR : |"**

Cause: The VSR encountered an error while setting the IF switch.

Description: In response to an "ifs" command the VSR sends commands to the IFS in order to have its IF signal set to the desired source. If the IFS does not acknowledge the command or returns an error code the VSR issues an event notice displaying info about the error.

Action: If the syntax of the input is correct, maintenance personnel should be called in to resolve the problem with the IF switch. When the IFS is working reissue the "ifs" command.

**7 CRITICAL, "SCHAN | RECORD JUMPED FROM | TO |"**

Cause: Subchannel data is missing/out of sequence. Data has been lost.

Description: While recording subchannel data, the VSR checks the timestamp of each data record to ensure continuous, sequential data. If a gap is detected the VSR issues an event notice.

Action: Free up the VSR's computer resources by reducing unnecessary activities. If problem persists, consider using subchannels with narrower bandwidths.

**8 CRITICAL, "SCHAN | RECORD HAD INVALID TIME STAMP"**

Cause: The VSR encountered a subchannel data record with an invalid timestamp

Description: While running the VSR checks the timestamp of each data record to ensure continuous, sequential data. If an invalid timestamp is detected the VSR issues an event notice.

Action: Verify that the VSR is receiving stable 5MHz, 1PPS, and TCT timecode signals from the FTS distribution.

**9 CRITICAL, "SCHAN | FAILED TO SAVE RECORD |"**

Cause: Unrecoverable error writing data to disk. Data has been lost.

Description: The VSR stores recorded subchannel data in a custom file system which spans multiple disks. This event will be reported if an attempt at writing a data record to disk fails.

Action: Stop further attempts at recording to the subchannel using the "rec" command (or suspend all subchannels via the "halt" command). Correct the underlying disk problem. Restart subchannel recording using the "rec" command (or the "run" command, if halted).

**10 CRITICAL, "DIG LO SYNTH OUT OF LOCK"**

Cause: The LO synthesizer of the VSR's digitizer is out of lock.

Description: The VSR digitizer "locks up" its internal frequency synthesizers with the station 5MHz reference. The VSR periodically checks flags on the digitizer which indicate if the internal synthesizers are in lock. If they are not an event notice is issued.

Action: Have maintenance personnel verify that the digitizer is receiving station 5MHz and 1PPS signals and then restart the VSR. If the condition persists then replace the digitizer.

**11 CRITICAL, "DDC 1PPS NOT PRESENT"**

**12 CRITICAL, "DDC MSEC NOT PRESENT"**

Cause: An error condition has been detected on the digital down converter.

Description: The digitizer sends 256MHz clock and 1PPS signals to the digital down converter. A counter on the down converter divides down the 256MHz clock to generate msec and timecode signals. The 1PPS is used to synchronize this counter. The VSR periodically checks flags on the digital down convertor which indicate if either the 1PPS or msec signals are missing. If an error is indicated an event notice is issued.

Action: Verify that the digitizer is receiving station 5MHz and 1PPS signals and that the cables from the digitizer to the digital down converter are in place. If the condition persists then maintenance personnel should be called in to find the source of the error.

**13 CRITICAL, "NO MSEC INTERRUPTS DETECTED ON RT"**

Cause: The msec interrupt signal provided by the VME boards is missing.

Description: The VSR cannot function without the msec interrupt signal provided by the VME boards. The lack of msec interrupts indicates that there is a problem with the VME boards or that one or all of the serial IO signals processed by the VME boards is bad.

Action: Restart the VSR which issued the event notice. It may be necessary to restart both channels of the VSR. If the VSR fails to restart then maintenance personnel should be called in to find the source of the error.

**14 CRITICAL, "| PRDX SEARCH FAILED"**

Cause: A search of the specified predicts failed to return a valid data point.

Description: While running the VSR searches the predicts for current data points each second. If no data point in the predicts matches the specified search parameters an event notice is issued.

Action: Verify that the predicts are correct. Restart the VSR with the corrected predicts file.

**15 CRITICAL, "PRDX PARSE FAILED : | : |"**

Cause: The VSR failed to parse the specified predicts file.

Description: The VSR encountered a problem while parsing the specified predicts file. The name of the problematic predicts and a brief description of the problem are incuded the the event notice.

Action: Verify that the predicts are correct. Restart the VSR with the corrected predicts file.

**16 CRITICAL, "DIG AMP OF | INDICATES THE IF SIGNAL MAY BE MISSING"**

Cause: The IF signal feeding the VSR digitizer appears to be missing.

Description: The VSR monitors the signal level at the digitizer's ADC. Signal levels below -35.0 dB usually indicates that the IF signal is missing.

Action: Verify that the VSR digitizer is receiving a good IF signal.

**17 CRITICAL, "|"**

Cause: The VSR data processor and realtime processor have lost a network connection.

Description: The VSR data processor and realtime processor use network socket connections to communicate. If the VSR detects that one of these connections has been lost an event notice is issued.

Action: Restart the VSR which issued the event notice. It may be necessary to restart both channels of the VSR. Maintenance personnel should be notified of the problem.

**18 CRITICAL, "| FAILED: |"**

Cause: The VSR failed to successfully process the CHAN command.

Description: If the VSR fails to successfully process CHAN, an event notice is issued. This event is usually triggered by an invalid CHAN command or CHAN issued with invalid arguments.

Action: If the CHAN issued was valid then examine previous event messages for possible information regarding the CHAN failure. Reissue CHAN after error condition has been resolved.

**19 CRITICAL, "IFS : COULD NOT FIND | CABLE"**

Cause: The IF switch reported that the desired input could not be found.

Description: In response to an "ifs" command the VSR sends commands to the IFS in order to have its IF signal set to the desired source. If the IFS reports that the desired input is not found the VSR issues this event notice.

Action: Maintenance personnel should be called in to resolve the problem with the IF switch. When the IFS is working reissue the vfy command.

**20 CRITICAL, ""**

**21 CRITICAL, ""**

**22 CRITICAL, ""**

**23 CRITICAL, ""**

**24 CRITICAL, ""**

**25 CRITICAL, ""**

**26 CRITICAL, ""**

**27 CRITICAL, ""**

**28 CRITICAL, ""**

**29 CRITICAL, ""**

**30 WARNING, "| FAILED : |"**

Cause: The VSR failed to successfully process a command.

Description: If the VSR fails to successfully process a command, an event notice is issued. This event is usually triggered by invalid commands or commands issued with invalid arguments.

Action: If the command issued was valid then examine previous event messages for possible information regarding the command failure. Reissue command after error condition has been resolved.

**31 WARNING, "DP TIME DIFFERS FROM RT TIME BY | SECS"**

Cause: The VSR data processor and realtime processor times do not agree.

Description: The VSR data processor obtains current time via a network connection to an NTP server. The VSR realtime processor obtains current time via a RS-232 connection to a TCT. If the data processor's time and the realtime processor's time do not agree an event notice is issued.

Action: Verify that the VSR data processor and realtime processor are able to obtain time information from there respective sources.

**32 WARNING, "RT COULD NOT READ TIMECODE | TIMES"**

Cause: The realtime processor could not read the timecode signal from the TCT.

Description: The VSR realtime processor initializes a software time counter from the TCT timecode on startup. Thereafter it verifies time synchronization with the TCT timecode each second. If at some point after startup the VSR loses the timecode signal from the TCT it will be unable to verify time synchronization and will issue an event notice. If the VSR is restarted in this condition it will get hung up trying to initialize the software time counter.

Action: The VSR can run without a TCT timecode signal if its software time counter has been initialized. If the time reported by the VSR is correct no immediate corrective action is required, however maintenance personnel should be called in to resolve the problem. Problems with the RS232 serial cable from the VSR to the TCT is a common cause.

**33 WARNING, "RT LOST TIME SYNC | TIMES"**

Cause: The software time counter did not agree with the timecode read from the TCT.

Description: On startup the VSR realtime processor initializes a software time counter from the timecode supplied by the TCT. Thereafter it verifies time synchronization with the TCT timecode each second. If at some point after startup the software time counter does not agree with the TCT timecode an event notice will be issued and the software time counter will be reset.

Action: These errors are usually triggered by leap seconds applied to the TCT; in this case they can be ignored. If not, maintenance personnel should be notified for resolution of the problem.

**34 WARNING, "RT LOST MSEC SYNC | TIMES, SW_MSEC = |, HW_MSEC = |"**

Cause: The software msec counter did not agree with the hardware msec counter.

Description: On startup the VSR realtime processor initializes a software msec counter with the value read from a hardware msec counter on one of the VME boards. Thereafter it verifies msec synchronization with the hardware on each msec interrupt. If at some point after startup the software msec counter does not agree with the hardware msec counter an event notice will be issued and the software msec counter will be reset.

Action: These errors are usually triggered by serial IO errors. If these errors occur and are not accompanied by serial IO errors and the errors occur frequently and appear to be correlated with degraded performance then a spare VSR should be used to complete the pass and maintenance personnel should be called in to resolve the problem.

**35 WARNING, "INVALID HW_MSEC | TIMES, HW_MSEC = |"**

Cause: The msec number read from the VME boards was invalid. Description : Every msec the VSR realtime processor reads a hardware counter from one of the VME boards which represents the current msec of the second. If the value read from this msec counter is invalid (less than 0 or greater than 999) then an event notice is issued.

Action: These errors are usually triggered by other serial IO errors. If these errors occur and are not accompanied by other serial IO errors and the errors occur frequently and appear to be correlated with degraded performance then a spare VSR should be used to complete the pass and maintenance personnel should be called in to resolve the problem.

**36 WARNING, "RT MDLS TASK RAN LONG | TIMES"**

**37 WARNING, "RT MSEC TASK RAN LONG | TIMES"**

Cause: The specified task on the realtime processor ran long.

Description: The msec and mdls tasks on the realtime processor are started at regular intervals (every msec, and every second). Before the task is started for the current interval a check is performed to see if the task has finished processing for the previous interval. If the task is not finished then an appropriate "task ran long" event notice is issued.

Action: If the error is reported only occasionally (less than once every 15 minutes) and the VSR's performance is nominal then no corrective action is necessary, however the Exception Handler should be notified for resolution of the problem. If the error occurs more frequently and appears to be correlated with degraded performance then a spare VSR should be used to complete the pass and maintenance personnel should be called in to resolve the problem.

**38 WARNING, "DIG AMP OF | IS OUT OF RANGE OF DESIRED AMP OF |"**

Cause: The signal level at the ADC of the specified band is out of range of the specified desired amp.

Description: The VSR periodically measures the signal level at the ADC of the digitizer. If the signal level is not within range of the desired signal level an event notice is issued.

Action: Issue an "att auto" command. Note that adjusting the attenuator will cause a phase jump in the recorded data. If the problem persists verify that the VSR digitizer is receiving a good IF signal.

**39 WARNING, "SCHAN | CIC FILTER OVERFLOW"**

**40 WARNING, "SCHAN | FIR1 FILTER OVERFLOW"**

Cause: An overflow condition has been detected in the specified subchannel filter.

Description: The gain of each subchannel filter needs to be set appropriately for the signal which flows through it. If the signal is stronger than expected the filter can overflow. When an overflow condition is detected the VSR issues an event notice.

Action: Verify that the VSR ADC amp is within allowable limits. If not use a "att auto" command to adjust it. Use the "fgain" command to adjust the subchannel filter gain to the appropriate value.

**41 WARNING, "SCHAN | DATA IS CLIPPED"**

Cause: The subchannel's data is clipped.

Description: This event notice is issued when a subchannel's data has an excessive number of samples at the upper and lower peak values. This indicates that the data may be clipped, which can degrade the quality of the recorded data.

Action: Examine the subchannel's histogram display to verify the condition. Use the "fgain" command to adjust the subchannel filter gain to the appropriate value.

**42 WARNING, "SCHAN | DATA PEAK IS LOW"**

Cause: The peak value of the subchannel's data is low.

Description: This event notice is issued when the peak value of a subchannel's data is too low. This indicates that the data is not making use of all of the sample bits available, which can degrade the quality of the recorded data.

Action: Examine the subchannels histogram display to verify the condition. Use the "fgain" command to adjust the subchannel filter gain to the appropriate value.

**43 WARNING, "SCHAN | HIGH 2BIT DATA"**

Cause: The subchannel's data has an excessive number of samples at the upper and lower peak values.

Description: This event notice is only valid for subchannels configured to use 2 bit samples. It is issued when the subchannel's data has an excessive number of samples at the upper and lower peak values. This condition degrades the quality of the 2 bit sample data.

Action: Examine the subchannels histogram display to verify the condition. The peak bins of the histogram should contain 1/3 of the total histogram samples. If the signal level at the ADC is to high (> -8.0), adjust the setting of the DIG attenuator with an "att auto" command. Use the "fgain" command to adjust the subchannel filter gain to the appropriate value.

**44 WARNING, "SCHAN | LOW 2BIT DATA"**

Cause: The subchannel's data has too few samples at the upper and lower peak values.

Description: This event notice is only valid for subchannels configured to use 2 bit samples. It is issued when the subchannel's data has too few samples at the upper and lower peak values. This condition degrades the quality of the 2 bit sample data.

Action: Examine the subchannels histogram display to verify the condition. The peak bins of the histogram should contain 1/3 of the total histogram samples. If the signal level at the ADC is to low (< -12.0), adjust the setting of the DIG attenuator with an "att auto" command. Use the "fgain" command to adjust the subchannel filter gain to the appropriate value.

**45 WARNING, "| DATA IS ALL ZEROS"**

Cause: The VSR data processor received data from the realtime processor that was all zeroes.

Description: While running the VSR realtime processor sends batches of data to the data processor at regular intervals. When the data arrives at the data processor it checks to see if the data is all zeros. If the data is bad an event notice is issued.

Action: A possible cause of this condition is low signal power entering the VSR digitizer. In this case a "att auto" command may solve the problem. Another possible cause is improper subchannel filter gain. In this case a "fgain" command should be used to adjust the filter gain.

**46 WARNING, "SCHAN | TRANS BUFFS FULL | TIMES"**

**47 WARNING, "| MSG Q FULL | TIMES"**

Cause: The realtime processor could not get a transmit buffer when needed.

Description: The VSR realtime processor sends data to the VSR data processor via transmit buffers. If an empty transmit buffer is required and none are available an event notice is issued.

Action: If the VSR is being used to simply monitor a signal then immediate corrective action may not be necessary. However if recording is enabled or will be enabled then a spare VSR should be used to complete the pass as data will be lost. Maintenance personnel should be notified for resolution of the problem.

**48 WARNING, "DIG 1PPS OUT OF SYNC"**

Cause: The digitizer's internal 1PPS signal is not in sync with the station 1PPS signal.

Description: The VSR digitizer generates an internal 1PPS signal by counting down the station 5MHz clock. When the VSR is started the digitizer synchronizes its internal 1PPS signal with the station 1PPS signal. The VSR periodically checks a flag on the digitizer which indicates if the internal 1PPS signal is in sync with the station 1PPS. If it is not an event notice is issued.

Action: Have maintenance personnel verify that the digitizer is receiving station 5MHz and 1PPS signals and then restart the VSR which issued the event notice. It may be necessary to restart both channels of the VSR. If the condition persists then replace the digitizer.

**49 WARNING, "DIG TST SYNTH OUT OF LOCK"**

Cause: The specified digitizer synthesizer is out of lock.

Description: The VSR digitizer "locks up" its internal frequency synthesizers with the station 5MHz reference. The VSR periodically checks a flags on the digitizer which indicate if the internal synthesizers are in lock. If they are not an event notice is issued.

Action: Have maintenance personnel verify that the digitizer is receiving station 5MHz and 1PPS signals and then restart both channels of the VSR. If the condition persists then replace the digitizer.

**50 WARNING, "DIG | PWR SUPPLY OUT OF RANGE"**

**51 WARNING, "DDC | PWR SUPPLY OUT OF RANGE"**

Cause: The indicated power supply is outside of its expected range.

Description: The VSR periodically checks a flags on the digitizer and digital down convertor which indicate if the power supplies are in range. If they are not an event notice is issued.

Action: If this condition persists then replace the indicated device.

**52 WARNING, "DDC | OUTCHK ERROR"**

Cause: The digital down converter output checker has detected a malfunction on the specified channel board.

Description: The VSR periodically checks the output checker flags on the digital down convertor which indicate if an error has occurred on one of the channel boards. If an error is indicated an event notice is issued.

Action: If this condition persists then replace the down converter.

**53 WARNING, "DDC CHAN BRD |, VSR CHAN | - FAILED TDEC TEST"**

**54 WARNING, "DDC CHAN BRD |, VSR CHAN | - FAILED TFIR TEST"**

Cause: A malfunction has been detected on the specified channel board of the digital down converter.

Description: As part of the 'tddc' command the VSR runs various checks on the digital down convertor. If one of these checks fails an event notice is issued and the VSR fails to verify.

Action: Call Exception Handler to determine if the digital down convertor should be replaced.

**55 WARNING, "DIG ADCTEST | PARAMETER OUT OF RANGE"**

Cause: The digitizer's analog to digital to converter is not operating within desired limits.

Description: As part of the 'tdig' command the VSR runs a test on the digitizer's analog to digital converter. If one of the ADC's measured performance parameters is not within desired limits an event notice is issued.

Action: Call Exception Handler to determine if the digitzer should be replaced.

**56 WARNING, "DD FAILED TO EXECUTE | COMMAND"**

Cause: The digital down converter failed to acknowledge a command.

Description: The VSR realtime processor communicates with the digital down convertor via an RS232 serial port connection. The digital down converter sends an acknowledge for each command it receives. If the realtime processor sends a command and does not receive an acknowledge within a timeout period an event notice is issued.

Action: First, retry the command. If the error persists, power the VSR hardware off and on and restart both channels of the VSR. If the error still persists, maintenance personnel will need to determine the source of the problem.

**57 WARNING, "DMA ACCESS ERROR | TIMES"**

Cause: A hardware error occured on the VSR VDP.

Description: The VSR VDP uses DMA transfers to read data from the VME boards. If a DMA transfer does not complete successfully this event notice is issued.

Action: If the error is reported only occasionally (less than once every 15 minutes) and the VSR's performance is nominal then no immediate action is necessary, however the Exception Handler should be notified for resolution of the problem. If the error occurs

more frequently and appears to be correlated with degraded performance then a spare VSR should be used to record the remainder of the pass.

**58 WARNING, "SCHAN | NUM_SAMPLES != SAMPLE_RATE | TIMES"**

Cause: A hardware error occured on the VSR VDP.

Description: The number of samples generated by the hardware for each subchannel of the VSR depends on the configured bandwidth of the subchannel. If the hardware generate too few or too many samples the VSR issues an event notice.

Action: If the error is reported only occasionally (less than once every 15 minutes) and the VSR's performance is nominal then no immediate action is necessary, however the Exception Handler should be notified for resolution of the problem. If the error occurs more frequently and appears to be correlated with degraded performance then a spare VSR should be used to record the remainder of the pass.

**59 WARNING, "CNV BRD, SLOT |, BLK | - IO IQ SYNC ERROR"**

**60 WARNING, "CNV BRD, SLOT |, BLK | - | IO PLL ERROR"**

**61 WARNING, "| BRD, SLOT |, BLK | - IO TAXI ERROR"**

**62 WARNING, "| BRD, SLOT |, BLK | - IO TIMECODE ERROR"**

**63 WARNING, "| BRD, SLOT |, BLK | - IO CLK ERROR"**

**64 WARNING, "| BRD, SLOT |, BLK | - REF CLK ERROR"**

Cause: The specified error has been detected on the specified board.

Description: The VSR periodically checks flags on the hardware for various errors, when one is found an appropriate event notice is issued.

Action: If the error is reported only occasionally (less than once every 15 minutes) and the VSR's performance is nominal then no immediate action is necessary, however the VSR which issued the event notice should be scheduled for maintenance. If the error occurs more frequently and appears to be correlated with degraded performance then the specified board should be replaced as soon as possible to prevent further data loss.

**65 WARNING, "DESIRED DDCLO | IS OUTSIDE 265-375 MHz RANGE"**

Cause: The desired digital down converter LO is outside the allowable range.

Description: The VSR adjusts the DDCLO in response to a "ddclo" command. If the desired DDCLO is not within allowable limits it is clipped at the limit and an event notice is issued.

Action: If the event notice was issued in reponse to a "ddclo value" command then the specified value was out of range. If the event notice was issued in response to a "ddclo auto" command then the IF frequencies specified by the combination of the frequency predicts, frequency offset and subchannel frequency offsets may be outside of the VSR's IF frequency range.

**66 WARNING, "SCHAN | IF FREQ | IS OUTSIDE 265-375 MHz RANGE"**

Cause: The desired IF band frequency is outside the allowable range.

Description: The VSR computes the RF frequencies of each subchannel from the frequency predicts, predicts frequency offset and subchannel frequency offsets. These frequencies are converted to IF band by subtracting the appropriate LO values. If the resulting IF band frequencies are out of range an event notice is issued.

Action: The desired signal is outside of the VSR's IF passband. The only way to resolve this problem is to adjust the RF to IF downconverter frequency.

**67 WARNING, "SCHAN | BASEBAND FREQ | IS OUTSIDE +/- 8 MHz RANGE"**

Cause: The desired base band frequency is outside the allowable range.

Description: The VSR computes the RF frequencies of each subchannel from the frequency predicts, predicts frequency offset and subchannel frequency offsets. These frequencies are converted to base band by subtracting the appropriate LO values. If the resulting base band frequencies are out of range an event notice is issued.

Action: Use the "ddclo auto" command to recenter the desired subchannel base band frequencies in the +/- 8 MHz base band window. If error persists use the "sfro" command to adjust the subchannel frequency offsets to within the +/- 8 MHz base band window.

**68 WARNING, "ERROR OPENING FILE: |"**

Cause: This event notice is issued whenever the VSR fails to successfully open a file.

Description: During normal processing the VSR is required to open various files. If the VSR is unable to open one of these files an event notice is issued.

Action: The Exception Handler should be called in to determine the source of the problem.

**69 WARNING, "SCHAN | RESID FREQUENCY | Hz IS HIGH"**

Cause: The subchannel's detected signal residual frequency is high.

Description: This event notice is issued when a signal is detected in a subchannel's data and the residual frequency of that signal is too high. This indicates that the signal is nearing the edge of the subchannel's usable frequency band, which can degrade the quality of the recorded data.

Action: Examine the subchannels fft display to verify the condition. Use the "fro" command to add a frequency offset to the frequency predicts (this will affect all subchannels) or use the sfro command to recenter a specific subchannel.

**70 WARNING, "CONNECTION MONITOR DATA | IS NOT VALID"**

Cause: Required monitor data for the connection is not valid.

Description: The NMC connection engine is required to publish monitor data describing the connection, including the items "DssList", "SpacecraftNumber", and "PassNumber". This event notice indicates that one or more of these items is not valid.

Action: Ensure that the NMC connection engine is publishing the above monitor data items.

**71 WARNING, "| NOT IN |"**

Cause: The configuration of the VSR does not match that of the NMC connection.

Description: While in an NMC connection, once the VSR configuration is verfied, the configured DSS, SCN, and Pass number are compared with the connection monitor data items "DssList", "SpacecraftNumber", and "PassNumber". Mismatchs are reported via this event notice.

Action: Adjust the VSR configuration to match that of the NMC connection, by choosing correct predicts or entering appropriate IFS.

**72 WARNING, "NO DDC CHAN BRDS AVAILABLE"**

Cause: No DDC channel boards are currently available.

Description: The VSR's digital down converter has four channel boards available for use by two 'virtual' VSRs. The channel boards are assigned to the virtual receivers in response to a 'chan' command on a first come first serve basis. If a 'chan' command is issued which requires the allocation of a new channel board when none are available an event notice will be issued.

Action: Use the 'chan' command to free up channel boards that are no longer needed.

**73 WARNING, "SCHAN | FAILED TO SAVE FFT RECORD |"**

Cause: Unrecoverable error writing fft data to disk.

Description: When the VSR is running but not recording it writes subchannel data records to a temporary file which is used by the VSR's realtime data monitor process. This temporary file is on the same custom file system used for recording data. This event will be reported if an attempt at writing a data record to the temporary file fails.

Action: Correct the underlying disk problem.

**74 WARNING, "DISK FULL IN | AT CURRENT RECORD RATE"**

Cause: The available disk space will be used up in less than or equal to the time specified by DISK_FULL_WARN_TIME.

Description: While recording, the server calculates the projected time that the available disk space will get used up. When this time is less than or equal to the user defined Set parameter DISK_FULL_WARN_TIME, the server issues this event message approximately once every minute until the disk is empty.

Action: Make sure the available disk space doesn't get to 0.00%.

**75 WARNING, "IFS : COULD NOT FIND | CABLE"**

Cause: The IF switch reported that the desired input could not be found.

Description: In response to an "ifs" command the VSR sends commands to the IFS in order to have its IF signal set to the desired source. If the IFS reports that the desired input is not found the VSR issues this event notice.

Action: No action required. The VSR will attempt to select an alternate input.

**76 WARNING, "VERIFY | IS ON | CABLE"**

Cause: The IF switch has been set to the opposite polarization.

Description: In response to an "ifs" command the VSR sends commands to the IFS in order to have its IF signal set to the desired source. If the IFS reports that the desired input is not found, the VSR sends commands to select the opposite polarization. If this is successful, the VSR issues this event notice.

Action: Verify that the antenna is configured to deliver the desired polarization on the indicated, opposite polarization cable.

**77 WARNING, ""**

**78 WARNING, ""**

**79 WARNING, ""**

**80 DEVIATION, "|"**

Cause: The current time is either before or after the range of times present in the specified predicts.

Description: While running, the VSR searches the predicts for current data points each second. One parameter used in the search is the current time. If the current time is before the timetag of the first data point in the predicts then the first data point is used. If the current time is after the timetag of the last data point in the predicts then the last point is used. In either case, an event notice is issued to notify the operator that the predicts are being extrapolated from either the first or last data point. The times are in days and hours, or hours and minutes, or minutes and seconds and are sent every ~40 seconds.

Action: If the amount of extrapolation is small (less than about 10 minutes) then the event notice can be ignored. If the extrapolation time is unexpectedly large then the operator should obtain a new set of predicts files which contains data points for the current time.

**81 DEVIATION, "PREDICTS TIME SHIFTED | SECONDS"**

Cause: The VSR is configured to time shift the frequency predicts.

Description: The VSR is capable of time shifting frequency predicts. This allows the VSR to use old frequency predicts files for running system tests. When the VSR is configured to time shift the frequency predicts it issues an event notice.

Action: If time shifting is not desired use the 'pred' command to reload the frequenct predicts without a time shift.

**82 DEVIATION, "DD_COMM IS IN USE"**

Cause: Communication with the digital down converter is blocked because the 'dd_comm' command is in use.

Description: The VSR realtime processor communicates with the digital down convertor via an RS232 serial port connection. The 'dd_comm' command can be issued at the realtime processors command prompt to start a program which allows maintenance personnel to interact directly with the digital down converter. When the 'dd_comm' command is in use, all other access to the digital down converter is locked out. If the VSR attempts to communicate with the digital down convertor while the 'dd_comm' command is in use, an event notice is issued.

Action: Discontinue use of the 'dd_comm' command then reissue the VSR command which was blocked.

**83 DEVIATION, "SELECTED IFS IF_SOURCE | != PRDX IF_SOURCE |"**

Cause: This event notice is issued in response to an "ifs" command if the specified if_source is not the same as the if_source derived from predicts information.

Description: Normaly an 'ifs auto' command is used to automatically select the if_source specifed by the predicts dss id and downlink band. If the 'ifs' command is used to select a different if_source this event will be issued.

Action: If the "ifs" command was issued in error issue an "ifs auto" command to select the if_source specified by the predicts.

**84 DEVIATION, "IFS IF_SOURCE HAS NOT BEEN SET"**

Cause: This event notice is issued in response to an 'run' command if the IF selector switch has not been configured.

Description: Normaly an 'ifs auto' command is issued before running to automatically select the if_source specifed by the predicts dss id and downlink band.

Action: Issue an "ifs auto" command to select the if_source specified by the predicts.

**85 DEVIATION, "VME BUS DMA TRANFERS WILL BE 32 BIT"**

Cause: One or both of the ASD boards in the VSR's VME chassis have old VME proms

Description: The ASD boards in the VSR's VME chassis use proms to load an FPGA which provides the VME interface. Older versions of this prom restrict the ASD boards to using 32 bit DMA transfers. Newer versions allow 64 bit DMA transfers. If an older version prom is detected the VSR limits itself to using 32 bit DMA transfers which in turn reduces the recording bandwidth of the VSR. The VSR will reject configuration requests with recording bandwidths that are too high.

Action: The Exception Handler should be called to have the proms updated

**86 DEVIATION, "DIG TEST SYNTHESIZER FREQ SET TO | MHz"**

Cause: The digitizer test synthesizer is enabled.

Description: The VSR's digitizer has the ability to inject a test tone at a specified frequency. The test tone is usualy disabled. When the test tone is enabled this event notice is issued.

Action: If the test tone is not desired use the 'tsf' command to disable it.

**87 DEVIATION, "JOB SCHEDULED: |"**

Cause: This event notice is issued in response to at jobs being found on the local server which are scheduled for future execution of VSR scripts.

Description: This event will appear once in an NMC log window, and or a tclient command window when the VSR is first starting up and during each new client connect. It will list all VSR at jobs scheduled to go off in the future.

Action: Remove conflicting at jobs with 'at -r <at_job_id>' or use another VSR.

**88 DEVIATION, ""**

**89 DEVIATION, ""**

**90 DEVIATION, ""**

**91 DEVIATION, ""**

**92 DEVIATION, ""**

**93 DEVIATION, ""**

**94 DEVIATION, ""**

**95 DEVIATION, ""**

**96 DEVIATION, ""**

**97 DEVIATION, ""**

**98 DEVIATION, ""**

**99 DEVIATION, ""**

**100 PROGRESS, "|"**

Cause: This progress advisory event notice is issued whenever the VSR needs to issue multiple responses to a command.

Description: Some of the VSR commands require more than one line of text in the command response. This event notice is used to allow the multiple line response.

Action: No action required.

**101 COMPLETION, "| COMPLETED |"**

Cause: This progress advisory event notice is issued whenever the VSR successfully completes a command.

Description: The VSR sends this event notice each time it successfully completes command.

Action: No action required.

**102 PROGRESS, "Q |"**

**103 PROGRESS, "Queue is empty"**

Cause: An operator issued a "queue" command.

Description: These event notices are used to respond to the "queue" command.

Action: No action required.

**104 PROGRESS, "IFS OUTPUT | SET TO INPUT |"**

Cause: This event notice is issued as part of the VSR's 'ifs' command processing.

Description: In response to an 'ifs' command the VSR sends commands to the IF switch in order to have its IF signal set to the desired source. When the IFS acknowledges the command the VSR issues this event notice displaying the new settings of the IFS.

Action: No action required.

**105 PROGRESS, "| ATTEN SET TO |, BAND| AMP |, RMS |, PEAK |"**

Cause: This event notice is issued as part of the VSR's 'att' command processing.

Description: In response to an 'att' command the VSR sets attenuators in the digitizer so that the signal level at the digitizer's analog to digital converter is in the desired range. The new attenuator value settings and the analog to digital converter signal level are reported as a progress advisory event notice.

Action: No action required.

**106 PROGRESS, "DIG BAND| ADCTEST: PEAK |, DC |, 2ND |, 3RD |, RMS |"**

Cause: This event notice is issued as part of the VSR's 'tdig' command processing.

Description: As part of the 'tdig' command processing the VSR runs a test on the digitizer's analog to digital converter. The results of this test are sent as a progress advisory event notice.

Action: No action required.

**107 PROGRESS, "SCHAN | FIRST RECORD |"**

**108 PROGRESS, "SCHAN | LAST RECORD |"**

Cause: Recording switched on/off for the specified subchannel

Description: For each record on/off transition, the timestamp of the first (or last) record is reported.

Action: No action required.

**109 PROGRESS, "|"**

Cause: The VSR realtime and data processors have established network communications.

Description: The VSR establishes network communications during its initialization process. When the RT-DP sockets are established an event notice is issued.

Action: No action required.

**110 PROGRESS, "CLIENT IS DISCONNECTED"**

Cause: The NMC has been disconnected from the VSR server.

Description: When the NMC operator issues a DISC OD, or if any client issues a QUIT OD, the NMC will become disconnected from the VSR server. As long as the VSR remains in the NMC connection, the connection to the VSR server will be automatically reestablished.

Action: The NMC operator should release the VSR from the connection if finished.

**111 PROGRESS, "| OF | DDC CHAN BRDS AVAILABLE"**

Cause: This event notice is issued when the VSR completes the digital down convertor initialization.

Description: This event notice provides a count of the channel boards in the digital down convertor.

Action: No action required.

**112 PROGRESS, "DDC CHAN BRD | ASSIGNED TO VSR CHAN |"**

Cause: This event notice is issued in response to a 'chan' command.

Description: When a digital down convertor channel board is assigned to a VSR channel as part of a the 'chan' command processing this event notice is issued.

Action: No action required.

**113 PROGRESS, ""**

**114 PROGRESS, ""**

**115 PROGRESS, ""**

**116 PROGRESS, ""**

**117 PROGRESS, ""**

**118 PROGRESS, ""**

**119 PROGRESS, ""**

**120 PROGRESS, "|"**

### 4.1.1 Log-Only

Any events that have been disabled still go to the log. The VSR monitor data from fft processing (whether or not the plots are enabled) go to the log file.

| Log day & time Measure time | B | Pc/N0 | Measured Freq | Foff | FRO | SFRO | BW | Sec int | nP | nZF | nA | h |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 01/100<br>22:45:50>SCHAN3W1: 22:45:49 | 1 | 59.50 | 8406749625.48 | 976.56 | 5.20 | 10.00 | 1000 | 0.0102 | 1024 | 4096 | 10 | 1 |
| 01/100 | 1 | 65.78 | 8406749555.24 | 906.25 | 5.20 | 20.00 | 8 | 1.2800 | 1024 | 4096 | 10 | 1 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 22:45:51>SCHAN1N1:22:45:49 | | | | | | | | | | | | |
| 01/100<br>22:45:51>SCHAN2N2:22:45:49 | 1 | 65.78 | 8406749555.24 | 906.25 | 5.20 | 30.00 | 8 | 1.2800 | 1024 | 4096 | 10 | 1 |

### 4.1.2 Recovered

None.

## 4.2 Prompts

None.

## 4.3 Other Messages

None.

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# SECTION 5

## *REPORTS*

The VSR does not produce any reports.

# SECTION 6

# *OPERATIONAL SCENARIOS*

## 6.1 Normal Interactive Operations

This section describes the behavior of VSR under nominal condition. It attempts to provide a tutorial on the use of equipment. It focuses on the actions that need to be taken by an operator of the client software, whether through the NMC or remotely.

The VSR has one mode of normal operation, which can be perturbed by any number of clients working in harmony on the same experiment. As discussed in Section 1, the VSR supports two ways of communicating with the receiver, through a text line or by using the Graphical User Interface (GUI)

The descriptions below will cover the remote client interfaces, which should be sufficient for the NMC also, except for the link assignment details, which are the responsibility of the complex supervisor. The operator will be called an experimenter. The values in parenthesis are sample entries

### 6.1.1 Initiation and Use of Text Mode

Prior to an experiment the VSR is listening for an allocation request from a client and the application software is not running. Following is an example of a text mode run.

The experimenter first should find which VSRs can be used by listing the available receivers at the appropriate complex:

SCAN 10

The response will be a list of the receivers implemented and the experiment active on one or both of each VSRs in each pair:

gdscc.fltops.jpl.nasa.gov

10 VSR1A is expid or “allocated”

10 VSR1B is expid or “allocated”

10 VSR2A is available

10 VSR2B is available

The experimenter connects to one receiver per window for each band and DSS front end desired.

TCONNECT <name phone> <complex #> <VSR ##> (vs 4-5669 10 VSRla)

The prompt will show the receiver that's been connected and is ready to accept directives. The software has been loaded and is in the nominal configuration, needing only the appropriate down link frequency predict file to be loaded for configuration.

EXPID <exp_name> (vsr.tst.doy)

PRED <dlf file path and name> (/support_data_input/rmt_prdx)

This file name is arbitrary but the software uses the information within the file to set the dss id, spacecraft id, pass number, and band to (configure the IF Switch and the local oscillator). These values can be used when directed to automatically.

IFS AUTO

ATT AUTO

CHAN <chan#> <bw:bits..> (ALL 1 D 1:2 D)

DDCLO AUTO

Responses will appear in the text window as well as progress advisories, warnings, and critical alarms. To check the value of any configuration items, type the commands with no arguments.

IFS

The current value of the parameter will be returned.

RUN

The nominal configuration is one way, using X-prdx, no channels configured, no ddclo's set, last IFS and ATT settings, recording of all subchannels off, and no frequency offsets.

Following are the four commands that are likely to be used to control data recording and to align the receiver with the down link from the spacecraft during the running of an experiment. The commands can be entered at the appropriate times, with absolute times, or with relative times prepended. Commands can also have been placed in one or more scripts to be loaded with the SCRPT command.

REC <schan_id> ON (1n1 e)

REC <schan_id> OFF

The data file name will contain the spacecraft number, the dss id, the pass number, the receiver number and the schan_id as well as the day of year and time of CHAN.

FRO <frequency Hz.> [<way>] (255 2)

The frequency offset will be added to the current or requested predict.

WAY <1|2|3> [<uplink dss id>] (2)

Any number of record on and off pairs for each sub-channel can be entered and the data will be written to the appropriate file. However, to ensure different names for each recorded span the experimenter must reverify by entering the sequence:

HALT

CHAN <chan#> <bw:bits> (a 1 d 1:2 d)

RUN

New files will be opened with new times as part of the names.

To end the experiment, simply:

HALT

QUIT

This will end the running of the application and disconnect the text client.

### 6.1.2 Initiation and Use of GUI Mode

The VSR is listening for connection requests and the experimenter should ascertain which VSR is available to run an experiment or is running one that may be observed. Again, one window is needed for each connection, whether to an existing experiment or a new one. The following example will use a VSR at CDSCC:

1. Remote Client: SCAN 40

   NMC: Add the VSR to a connection.

   Remote Client: The response will be the list of receivers at SPC 40 and what experiments, if any, are active.

NMC: The VSR will appear in the list for the connection is was added to

2. Remote Client: GCONNECT ken 3-2651 40 VSR2A

   NMC: V1A D CNF

Remote Client: text client (tclient) will appear. Soon after, the main CNF display will pop up and attach to the bottom of the tclient. The interface has monitor data and many buttons which are active and labeled, depending on the state of the assembly, as well as an area for event notices and text commands, which is scrollable. Activation of command buttons and any entry of parameters cause the command to be entered in this area. The arrows on the keyboard will access previous entries for editing and reentry.

NMC: A stand-alone CNF display will pop up. Event notices will appear in the NMC connection window.

To run an experiment first select a script by clicking

1. Select Script… (or type scrpt)

and entering the appropriate path and file name.

Then click (or type) any of the following if needed:

FRO < #>

WAY < # >

Halt

Quit

etc., at appropriate times.

The SCRPT command, with path and file name, can also be entered at any time in the text area, or selected from the script list.

The main advantage of using the GUI Client interface is the display of VSR monitor data and spectrum plots, which are enabled or disabled with the Graphics buttons. The attributes of the FFT plots can be changed with appropriate commands. These changes affect all clients. The default values are:

FFTNP 1024

FFTNA 10

FFTTI 10

FFTZF 4

FFTHW ON

## 6.2 Scripted Operations

An entire experiment can be run from a script file which can be started from the NMC or any remote client interface. The script file would contain all the appropriate times, commands and parameters. The untimed directives will happen in sequence after the previous time. The relative times refer to the previous directive. The times can be entered in the following forms:

YY/DDD hh:mm:ss.ss

DDD hh:mm

hh:mm

+10.5m

-30s

+1h30s

+90

Absolute times require at least hh:mm, relative times must have no spaces and the default measure is seconds. To see or edit a script in progress use QUEUE or Q. Timed directives can also be entered while connected.

## 6.3 Diagnostic Program Execution

To run the basic H/W diagnostic program when both receivers are available, ssh into the VSR and type:

**/vsr/bin/auto_diag**

After test is finished the log file will be in /vsr/log. The test will take less than 4 minutes.

## 6.4 Operational Characteristics

### 6.4.1 Local File Management

Management of local files, e.g. deletion of old log, predict, or data files, is automatically done via cron job. BLS data files are purged at 00:00 after one week, log and temp files after 21 days and predicts and scripts are done per the purge day in their filenames.

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# SECTION 7

# *TROUBLESHOOTING*

## 7.1 On-Line Help

On-line help is available from the VSR GUI displays: STS, CHAN# and CNF. Clicking the HELP menu will activate an html page explaining the display and its features when interfaced with the NMC.

## 7.2 Off-Line Help

This document has been prepared to be consistent with the requirements and standards set forth in the following documents. These documents may be consulted for further information about VSR.

| | |
|---|---|
| *820-062* | *DSMS Terms and Abbreviations* |
| *813-1* | *DSN Engineering Documentation standards and Guidelines* |
| *820-016* | *Network Monitor & Control Subsystem (NMC) and Full Spectrum Processing Subsystem (FSP)/VLBI Science* |
| *0279-FSPR-NMC-VSR* | *Receiver (VSR) Interface* |
| *820-019, DFL-1-7* | *DSN Functional Address and Transport Standard* |
| *820-019, MON-1* | *Monitor and Control Services Standard* |
| *820-019, MON-2* | *DSN Monitor and Control Standard Practices* |
| *820-019, MON-7* | *Uniform Display Service Standard* |
| *831-12* | *Network control Project (NCP), Functional Design Document* |
| *UG-DSI-5605-OP* | *UDS User's Guide* |

## 7.3 Diagnostics

Diagnostics information is imbedded in event notices. See sec. 6.3 for automatic diagnostic program instructions. Other stand-alone diagnostic tools, if available, are described in the VSR Operations Maintenance Manual.

## 7.4 Recovery Procedures/Maintenance

This portion describes different actions that can be taken in response to a software or hardware failure in the VSR subsystem. The recovery actions are discussed in the order of increased severity of the problem.

### 7.4.1 VSR Software Failure

#### 7.4.1.1 Recovery Via UNIX Reboot

Operator needs to remote login using ssh into a VSR and issue a "reboot" to restart the system.Operator is required to have root privilege. Note that the <STOP>-A keyboard interrupt is not available on console-less, keyboard-less VSR.

#### 7.4.1.2 Recovery Via Power Cycling of Workstation

Use as the last resort on the VSR workstation. Remember this effects both VSRs in the rack.

### 7.4.2 VSR Hardware Failure

#### 7.4.2.1 Recovery Via VME Controller Reset

If problem is detected with the communication or controlling of VME hardware, a manual reset of VME controller may help. Remember this effects both VSRs in the rack.

#### 7.4.2.2 Recovery via Taking Unit Off-line for Maintenance

If indicators on the VME boards indicate failure, arrange for maintenance service.

#### 7.4.2.3 Recovery Via UNIX Boot

Operator needs to open a Unix window and issue a "reboot" to restart the system.Operator is required to have root privilege.

In the extreme case where the window is frozen, the command <STOP>-A at the console keyboard, followed by a "boot" command, can be used to restart the system. Note that this action is almost as violent as power circling, and therefore, should only be used as the absolute last resort.

#### 7.4.2.4 Recovery Via Power Cycling of SUN Workstation

Use only as the last resort.

### 7.4.3 FMT Hardware Failure

In the event that the FMT service can not be restored on the same SUN workstation, operator can configure another FMT into service, and make a connection to the appropriate VSR.

### 7.4.4 IF Switch Failure

Recovery from a failure in the IF Switch requires the use of local controls, a power reset, or maintenance support in board replacement.

### 7.4.5 Failure in Connection to MDS

Check if the MDS servers are active. If not, ask the NMC personnel to activate the MDS servers.

### 7.4.6 Playback Failure

If dor#.nocc personnel find that the playback had stopped because of network outage;

Copy the info file on the VSR to one with a different time at end;

Delete the lines that correspond to scans and files that have already been sent;

>cd /vsr/ext_cmnds

>/notfy /vsr/log/<info_filename> .

To append to a partial file use vdr_io on dor# in /export/home/ceg/vsr/client/bin .

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# SECTION 8

## *TOOLS AND UTILITIES*

The VSR has several data file utilities on the VSR server, described in 2.2.1, that are accessed from a UNIX window:

| | |
|---|---|
| aldev | plots the allan deviation of a data segment in a file |
| bls_ls | lists names of data files found on the data directories |
| bls_mv | renames a data file |
| bls_rm | removes named data file from all disks |
| vdr_dump | prints a data file in ascii text format |
| vdr_io | streams data files |

The GUI text window is outfitted with “readline”, i.e., the arrows work to retrieve and edit (with backspace key) previous directives in put by type in or by button activation. A tab input will complete a started directive name as far as possible, a double tab will list all directive names and a double tab after set will list all setable configuration names. Entering a directive without a parameter will complete with the current setting.

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# APPENDIX A

## *ACRONYMS AND ABBREVIATIONS*

| | |
|---|---|
| BLS | Block Level SAN/Blue Light Special (Recording device) |
| DDC | Digital downconverter |
| DLF | Downlink Frequency (type of predicts) |
| DSN | Deep Space Network |
| DSS | Deep Space Station |
| FSP | Full Spectrum Processing Subsystem |
| FSR | Full Spectrum Receiver |
| FTP | File Transfer Protocol |
| GDSCC | Goldstone Deep Space Communications Complex |
| Hz | hertz |
| IF | Intermediate Frequency |
| MDS | Monitor Data Service |
| MHz | megahertz |
| NMC | Network Monitor and Control Subsystem |
| NSS | Network Support Subsystem |
| OD | operator directive |
| Pc/No | Signal power-to-noise spectral-density ratio |
| PTS | Precision Telemetry Simulator |
| SAN | Storage Area Network |
| SCP | Secure Copy |
| SOM | Software Operator’s Manual |

| | |
|---|---|
| UDS | Uniform Display Service |
| VLBI | Very Long Baseline Interferometry |
| VME | Versa Module Eurocard |
| VSR | VLBI Science Receiver |

# APPENDIX B

## *DEFAULT PARAMETERS (MISSION-DEPENDENT)*

Not applicable.

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# APPENDIX C

## *TUTORIALS AND TECHNICAL INFORMATION*

Not applicable

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